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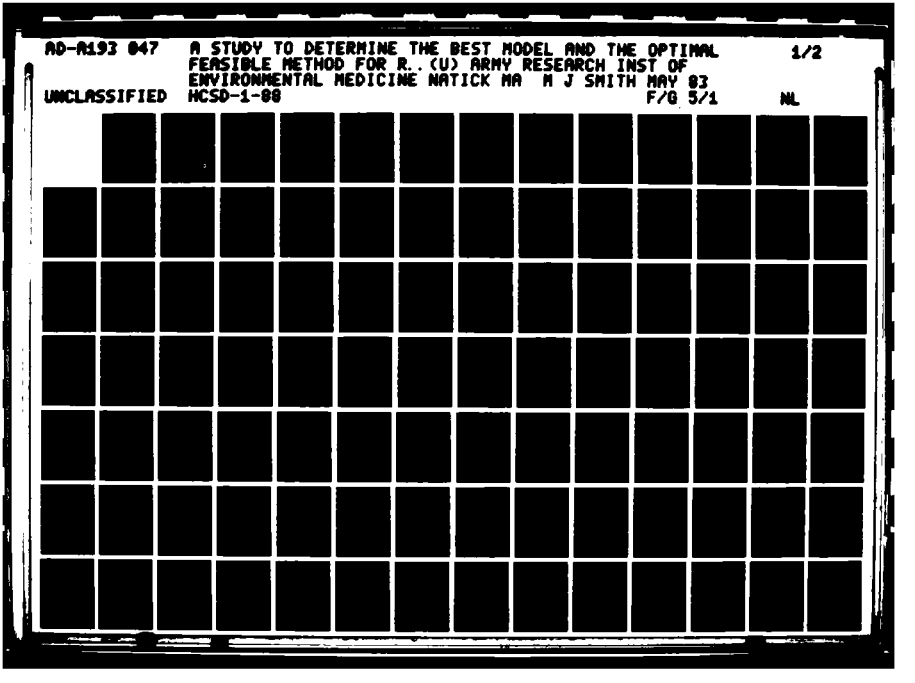

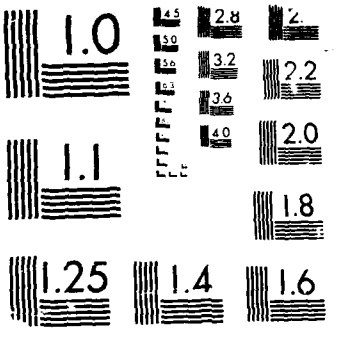

A STUDY TO DETERMINE THE BEST MODEL AND THE OPTIMAL FEASIBLE METHOD FOR REDUCING NO-SHOW BEHAVIOR AT A MILITARY SOCIAL WORK CLINIC

A Graduate Research Project

Submitted to the Faculty of

Baylor University

In Partial Fulfillment of the

Requirements for the Degree

of

Master of Health Administration

by

Major Michael J. Smith

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The study determined the best model to describe the high Social Work Service no-show rate for new patients and developed alternatives to reduce this no-show rate. The study collected data in three phases toensure that no major actions changed in procedures of patient no-shows and that alternatives implemented were for a thirty-day trial period. The study concluded that the variable element was a delay in the appointment request to the appointment time. The alternatives of flexible appointments and improved screening by the appointment clerks did decrease the no-show rate.

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A project of this scope cannot be undertaken by one individual acting alone, but requires the dedication and combined talents of many to culminate in a successful venture. I owe a debt of gratitude to many conscientious people for their generous contributions.

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The acquiring of an education is a life-long process requiring a great deal of sacrifice not only by the student but by the student's family as well. To my wife, Camilla, and children, Jeffrey and Brenda, who never complained while I devoted fewer hours to them and far more to studies during the past two years, I can find no words to accurately express my feelings of deep appreciation.

This project represents the culminating product of a demanding graduate program which has drawn heavily on previously acquired skills, and I owe a great debt of gratitude to two special individuals who instilled within me those values and provided the foundation from which this product could emerge:

This Graduate Research Project
is dedicated to
my parents
James G. and Gladys R. Smith

The opportunity for higher education is not within the means of all people, whether for lack of financial resources, sufficient mastery of basic scholarly skills, or individual motivation. A great amount of credit for any academic achievement should be bestowed upon those who encouraged the student throughout the entire educational process and who created the opportunity for future successes through personal sacrifices and unconditional support of basic and higher education. For this and much more, I thank my parents.

I. INTRODUCTION

The advantages of appointment systems in ambulatory health care settings have long been recognized. With the exception of emergency rooms and other crisis-oriented clinics, the individualized appointing of patients offers a more convenient and more personalized system while allowing the health care manager to better organize and control resources available to optimize the efficient delivery of services for the population supported. Compared to a nonappointed or walk-in system, individualized appointments are clearly more acceptable both to patients and to health care providers.

Special problems, however, have accompanied the establishment of appointment systems in most health care settings, the most significant being the disruptive effects of patients who fail to keep the scheduled appointment. These adverse consequences are felt throughout the entire system and pose serious problems for administrators, clinicians, and others concerned with efficiency in the delivery of health care. The patient who fails to report for the scheduled appointment is personally affected because he does not receive the professional care required. Whether the patient misses an initial, referral, or follow-up appointment, he exposes himself unnecessarily to medical risk which could have been more easily and effectively

treated if the patient had been examined at the appointed time.

The Joint Commission on Accreditation of Hospitals (JCAH), an independent organization which sets standards and conducts on-site surveys to measure compliance, has recognized the potentially adverse impact of missed appointments upon the patient's well-being. In its Accreditation Manual for Hospitals, the JCAH has included within the quality assurance standard for ambulatory care services that hospitals shall establish a system for the follow-up of broken appointments, when indicated, as well as an evaluation of the effectiveness of that system. Although this requirement is very general and provides for much discretion, it is clear that the JCAH has adopted the position that the health care organization, and not only the patient, bears responsibility for identifying and resolving missed appointments.[1]

In addition to the individual missing an appointment, other patients are affected because the health care provider, often overburdened and accessible only through a waiting list ranging from several days to several months, is made even more inaccessible by the patient who occupies an appointment space, but fails to keep or cancel the appointment in a timely manner.

The impact of broken appointments on the health care organization is serious, especially in terms of wasted productivity, increased waiting times for appointments, and lost revenue-earning opportunities. In times of tight budgets, decreasing staff, and shrinking financial support from federal

and other agencies, the pressure on management to fill available treatment times to optimize services provided and maximize revenue generated will increase and may even be the key to survival in a competitive environment. Finally, the ever-expanding field of medical research suffers from the patient who fails to show or drops out of a treatment protocol. This occurrence results in an incomplete set of data, undetected episodic illnesses, and, most seriously, erroneous conclusions reported in the literature.

In addition to the considerations previously discussed, failed appointments have a unique impact in the military health care setting. Congress has become greatly concerned about the results achieved by the spending of federal dollars on defense, and in particular on health care expenditures in Army, Navy, and Air Force treatment facilities. In order to better monitor and evaluate the cost of such care, Congress has ordered that a cost-finding system known as the Uniform Chart of Accounts be implemented which will clearly quantify and compare the cost of health care by specialty, by facility, and by branch of the service. Any factor which unnecessarily increases the cost of delivering the health care services in the federal sector has become a matter of great concern to managers of military medical facilities, and this concern will continue to intensify as the Uniform Chart of Accounts gains momentum. The patient who fails to show at the appointed time is one such factor which can effectively and wastefully idle costly

resources for the duration of the scheduled appointment. This idle clinic time is often observed and reported by other patients, staff personnel, and influential members from the supported community. The resulting situation is one conducive to conflict, distrust, and degraded morale.

In both the civilian and federal sectors, patient no-shows have complicated one of the most important responsibilities faced by managers of outpatient clinics--determining the optimal number of patients to schedule once staffing levels, hours of operation, and physical resources have been established. The manager's ability to accurately predict the level of no-shows has a profound effect on the operation of the clinic. If the manager consistently underestimates this level and fails to adjust clinic schedules adequately, valuable resources will be underutilized. The insidious impact of this situation is that, once wasted, the revenue-earning potential of idle resources is lost forever and cannot be recovered unless provisions of compensating for patient no-shows have previously been instituted into the scheduling process. If the manager consistently overestimates the number of patient no-shows, crowded waiting rooms with dissatisfied patients and staff will result as the appointees are seen much later than their scheduled time. The quality of care delivered in such a chaotic situation can easily deteriorate as the staff attempts to catch up in order to treat all patients.

The traditional approach towards managing no-show patients

has been to examine the clinic's historical distribution of no-shows, overbook appointments, and, on average, see the optimal number of patients. While this approach does have merit and has been used successfully, it has inherent drawbacks. Since overbooking is based on statistical averages, the actual number of patients reporting to the clinic often varies greatly from the desired optimal level. Furthermore, this method does not address the consideration that a no-show patient is one who probably should have been seen at the clinic, and it directs no attempt at encouraging these patients to keep their appointments. In extreme cases, health care providers have faced litigation for failing to identify and follow-up on patients who miss appointments. Merely overbooking appointments, therefore, does nothing to protect the practitioner from charges of abandonment and resultant harm from the noncontinuation of care. A more recent approach toward no-shows is to identify the characteristics of patients most likely to miss their appointments. Once a patient is identified as a likely no-show, either overbooking can be applied or extra efforts can be made to increase the probability of that patient reporting to the clinic at the appointed time. Extra efforts directed toward the likely no-show patient, such as mailed or telephonic reminders, can help protect the provider from litigation while at the same time increasing clinic efficiency.

Patient no-shows have plagued outpatient clinics for years and, left alone, would exacerbate the situation previously

described to the detriment of the health care delivery system and, in the military setting, to the detriment of national readiness. Any study, therefore, designed to identify the no-show tendencies of a clinic or population segment is of great value because intensive and cost-effective measures can be instituted to lessen the negative impact of that phenomenon. If successful, the general techniques utilized in such a study can be modelled and applied to alternate clinic sites and populations.

Development of the Problem

The severity of the no-show problem at Martin Army Community Hospital varies from clinic to clinic as depicted on the statistical report at Appendix A. The Family Practice Clinic, for example, has experienced a very low no-show rate, while the Obstetrics, Gynecology, and Outpatient Clinics have experienced much higher rates. The Social Work Service Clinic emerged as the site for this research project for several reasons. During the survey process conducted by the JCAH in July 1982, the Social Work Service chief put himself on record as being concerned about the no-show rate in his clinic, a rate which he felt was especially and unacceptably high for patients with first-time appointments. He further established, and the surveyor concurred, that this situation constituted a quality assurance issue which should be investigated and remedied.

Subsequent discussions with the clinic chief confirmed his sincere desire to cooperate in a research effort designed

to better define and reduce the extent of the no-show problem. The chief was enthusiastic about participating in a study designed to determine whether patient no-shows in the defined setting are, in fact, related to certain identifiable and quantifiable factors, whether those factors can be related to characteristics of the patients, and whether the no-show rate can be significantly reduced in a cost-effective manner. Furthermore, this clinic offered a manageable sub-population consisting of newly appointed patients, providing the researcher a well-defined market segment which could be modelled and analyzed, and which would be adaptable to a full range of experimental approaches aimed at reducing the adverse impact of failed appointments. Approaches which could be considered include overbooking, patient reminders, and creating a sense of obligation and confidence in the appointee by extending the interviewing procedure telephonically during the appointment process. Finally, the historical no-show rate had not been followed and scrutinized well by management personnel, as evidenced by the absence of data for that clinic on the report at Appendix A. In addition to serving the research purposes of this project, the selection of the Social Work Service Clinic would provide sufficient statistical information and motivation to better monitor no-show patterns in this clinical setting.

The clinic chief was asked to provide preliminary information and reported that over a ten-month period (January to October 1982) no-shows for new appointees ranged from 18 to

77 percent with a mean of 49 percent. Also, he reported that new appointments represented about 25 percent of the clinic's overall workload.

The project was endorsed by the administrator at Martin Army Community Hospital because it represented a beneficial application of techniques learned during the didactic phase of the US Army-Baylor University Graduate Program in Health Care Administration and because the methodology utilized, if successful, could be adapted to clinics with greater patient volume to analyze and materially reduce no-show rates in those areas. The potential benefits to Martin Army Community Hospital, therefore, were considered clearly sufficient to justify the research effort in the Social Work Service Clinic.

Statement of the Problem

The problem is to determine the best model for describing the no-show rate for new patients at the Social Work Service Clinic and to develop the optimal feasible method for reducing that phenomenon.

Limitations

Several limitations were imposed on this research project due to the time frame, clinic site, and mathematical models employed in analyzing the data. The analysis portion of the project was limited to an examination of new patients scheduled at the Social Work Service Clinic during the period 6 January through 8 April 1983. The application portion of the

project was limited to a thirty-day period beginning 20 April 1983. A major constraint, therefore, was that the volume of data available for analysis was limited to those new patients appointed at the Social Work Service Clinic during a relatively short period of time.

A second major limitation was that only those variables selected at the beginning of the study were considered as influencing individual tendencies of patients to show or fail to show for scheduled appointments. In fact, the variables themselves were selected not only because social work personnel felt a strong connection between those characteristics and no-show tendencies, but also because those variables were easily accessible and of practical utility in discriminating between patients most and least likely to show for scheduled appointments.

Other factors limiting the project were associated with the automation support available, the Statistical Package for the Social Sciences (SPSS), the specific parameters of which will be discussed later in this paper. A significant limitation with the discriminant analysis subprogram of SPSS is that, while an optimal solution is generated using the stepwise procedure, the maximal solution is not necessarily derived due to the program itself and to the impracticality of examining all possible combinations of variables for extent of discriminating power.

Assumptions

One key assumption in interpreting the results of this study is that the data collected is representative of actual tendencies in the larger patient population and that no extraneous factors were introduced in the study design to alter those tendencies. The preliminary statistical data concerning clinic utilization and prevailing no-show patterns was assumed accurate, and the continuation of these behaviors within the patient population was presupposed. The stable staffing of the Social Work Service and the continued capability of staff members to support this study were also assumed.

Certain assumptions are inherent in the mathematical model, two-group discriminant analysis, which was employed to analyze the data. In order to meaningfully interpret and apply the results of this technique, it is necessary to assume that the most relevant characteristics which influence no-show behavior were selected and that the two groups specified in the model as being dependent on those characteristics were, in fact, correct. The practical meaning of this assumption is that even if valid patient characteristics were selected as independent variables, the dependent variable, show or no-show, may have been incorrectly stated, and the characteristics may actually influence some other factor related or unrelated to no-show tendencies, such as patient willingness to comply with treatment regimen or even staff preference for type of patient.

Unlike mathematical models such as regression analysis which require normality of the dependent variable, the statistical theory of discriminant analysis requires that the multivariate normality of the independent variables be assumed.[2] Finally, it was necessary to assume that each patient's decision to show or not show for the appointment was independent of another patient's decision and that no common occurrence, such as weather or shared transportation, was a major determinant.

Literature Review

MEDLINE and manual searches were conducted focusing on techniques to model and analyze clinic no-show rates. The search logic utilized the topic identifiers of clinic no-shows, failed appointments, broken appointments, dropouts, and patient noncompliance. Fifty-four articles pertaining to the topic were located and reviewed. Most of the studies in the literature investigate appointment-keeping behavior at hospital outpatient clinics and psychiatric or mental hygiene clinics and are concentrated on pediatric and low socioeconomic populations. From the literature review, it became evident that little data exists for no-show rates in private practices, although one study did report that private pediatricians have failed appointments of less than 5 percent.[3] Furthermore, it became clear that although much attention has been given to predicting early dropouts among patients who have already entered a therapeutic regimen, much less is known of patients who schedule, but subsequently do not keep their first appointment. Also, most

published studies have dealt with the problem only to the point of characterizing the likely no-show patient, while few have attempted interventions to reduce that phenomenon.

Of forty-two independent studies which were reviewed, eleven dealt with hospital outpatient departments, medical care clinics, or primary care clinics; ten were concerned with psychiatric or mental hygiene clinics; and eight with pediatric outpatient departments or clinics. Only two articles were located which discussed the no-show problem in federal facilities, one from a Veteran's Administration Medical Center and one from an Army dental clinic in Europe. Overall no-show rates reported in the literature ranged from 15 to 52 percent. The predominant investigative technique, with very few exceptions, was a univariate chi-square analysis of data concerning the characteristics of patients scheduled at the clinic. Researchers typically reported that certain characteristics were either significantly related to no-show behavior or not significantly related. Appendix B summarizes the research findings of patient characteristics and their association with no-show behavior which were drawn from the literature review. Many of the inconsistencies in the conclusions derived from these studies can be attributed to differences in types of clinic, population served, and the researchers' definitions of key terms.

Representative of the studies documented in the literature is that of Carpenter, et al., who collected data at a hospital-

based psychiatric clinic pertaining to ten demographic and clinical variables and used the typical technique of chi-square analyses of differences between the show and no-show groups. Of the demographic characteristics sex, area of residence, distance of travel, age, socioeconomic status, and marital status, these researchers found age as the only variable which significantly differentiated the two groups. Specifically, patients eighteen to twenty-four years old were significantly less likely to keep their appointments than any other age group. Of the clinical characteristics investigated, it was determined that patients with no prior psychiatric treatment were significantly less likely to keep their initial appointment, that patients referred from a medical clinic or local physician were more likely to keep their appointment than those referred by themselves, friends, relatives, or an emergency room, and that a greater proportion of patients offering vague or evasive reasons for the appointment failed the initial appointment. Finally, this study concluded that patients who did not keep the initial appointment had to wait a significantly longer period of time for that appointment than those who showed.[4]

An examination of Appendix B reveals certain conclusions from the literature published to date. Although the patient's sex has generally not been found to be a good predictor of missed appointments, it appears that younger patients have a greater tendency to miss than older patients. The impact of race has been widely reported and discussed with mixed results

reported in the literature. Barron has concluded that race per se is probably not a factor, but that no-show rates of minority populations are related more to socioeconomic factors prevalent within those racial groups.[5] When studied, it appears that the patient's previous attendance record is a good predictor of future behavior. Hofmann and Rockert demonstrated the validity of this conclusion by showing that when patients are automatically reappointed after failing an appointment, the overall clinic no-show rate increased significantly.[6] Referral source has an effect, with patients referred by themselves and emergency rooms showing lower appointment-keeping behavior than those referred by a specific physician. A psychiatric type of medical problem may be more related to no-show behavior than other diagnoses. Finally, the time delay awaiting the appointment is apparently significantly related to no-show behavior with longer delays resulting in more failed appointments.

Although the chi-square method of analyzing and modelling clinic no-show behavior was the most commonly used in the literature, two other methods were reported. Shonick and Klein developed a model based on estimated conditional probabilities utilizing the patient characteristics of age, sex, and the number of previous appointments, the validity of which had been ascertained through preliminary chi-square analyses.[7] Dervin, Stone, and Beck utilized the SPSS discriminant analysis subprogram in analyzing ten characteristics thought to be predictors of appointment-keeping behavior at a family practice

center. These researchers found that, although the combined effect of all variables did reach statistical significance, the two-group discriminant analysis technique had failed to prove its practical utility and would likely not be an effective model for clinics with no-show rates of less than 40 percent. They did suggest, however, that future investigators concentrate on variables which were among the better predictors in their study, especially telephone ownership and marital status.[8]

Most of the interventions reported in the literature to reduce the rate of failed appointments were designed around mailed or telephonic reminders and showed significant decreases of 30 to 75 percent in the fail rate.[9] Nazarian, et al., found that mailing a card reminder to patients scheduled twelve days to eight weeks in advance at a multispecialty health clinic in a low-income area reduced the no-show rate to 36 percent, compared to 52 percent without reminders.[10] At a family practice clinic in a middle-class area, Hagerman found that although the relative risk of not showing for an appointment is 1.65 times greater without a mailed reminder than with one, the cancellation rate from those receiving reminders is more than doubled.[11] In their elaborate analysis comparing the cost and effectiveness of mailed versus telephonic reminders in outpatient clinics at a children's hospital center, Shepard and Moseley showed both strategies to be significantly and equally effective compared to a control group. Using actual wage scales, postage rates, telephone costs, and the results of time-and-motion studies,

they concluded that mailed reminders cost only twenty cents per appointment, compared to forty cents for telephonic reminders.[12] The follow-up study of Morse, et al., after eight years' routine use of mailed reminders at the site of Nazarian's earlier research, showed that although mailed reminders are effective initially, prolonged use has a waning effectiveness which diminishes with time.[13] The literature contained few examples of intervention mechanisms other than mailed or telephonic reminders. At an adolescent psychiatric clinic, Hildebrandt and Davis found that the no-show rate was reduced from 40 percent to 10 percent when appointed patients were provided a home visit in advance of the scheduled appointment.[14]

In their comprehensive review of the research on failed appointments, Deyo and Inui identified eighty-four factors which have been mentioned in the literature as possible relevant determinants of appointment-keeping behavior. Also, in proposing an agenda for future research, these authors emphasized that future investigators should consider utilizing a wider range of potentially predictive variables and should utilize more sophisticated multivariate analytical techniques.[15]

Research Methodology

The research approach was designed to complement clinic functioning and to require as few changes as possible to existing operational procedures. In order to avoid altering patient behavior as a result of the research design itself,

a prime concern was that no procedure, especially the actions of the appointment clerk, would be changed from the established routine until that point where the patient either showed or failed to show for the initial appointment. Prior to initiating the project, the sequence of events illustrated at Figure 1 was planned by the researcher and the Social Work Service Clinic chief. The project was planned in three phases: a preliminary phase, a data collection and analysis phase, and an application phase.

Before data could be collected, several preliminary tasks needed to be accomplished. A flow chart describing the operational aspects of the clinic appointment procedure was prepared as a tool for designing a data collection mechanism which would complement the existing system. Also, this model could prove useful during the application stage by indicating how and where to best intervene during the appointing process. The entire Social Work Service Clinic staff was briefed on the project in order to gain their support, clarify definitions, and identify those characteristics which should be measured throughout the study. Based on the staff input, it became necessary to design a form which would replace an existing intake interview information sheet and which would effectively capture the data required for the analysis phase of the project. The final preliminary step involved training the appointment clerk and coordinating with the Army Research Institute to gain familiarity with the SPSS program, a process which continued throughout the project.

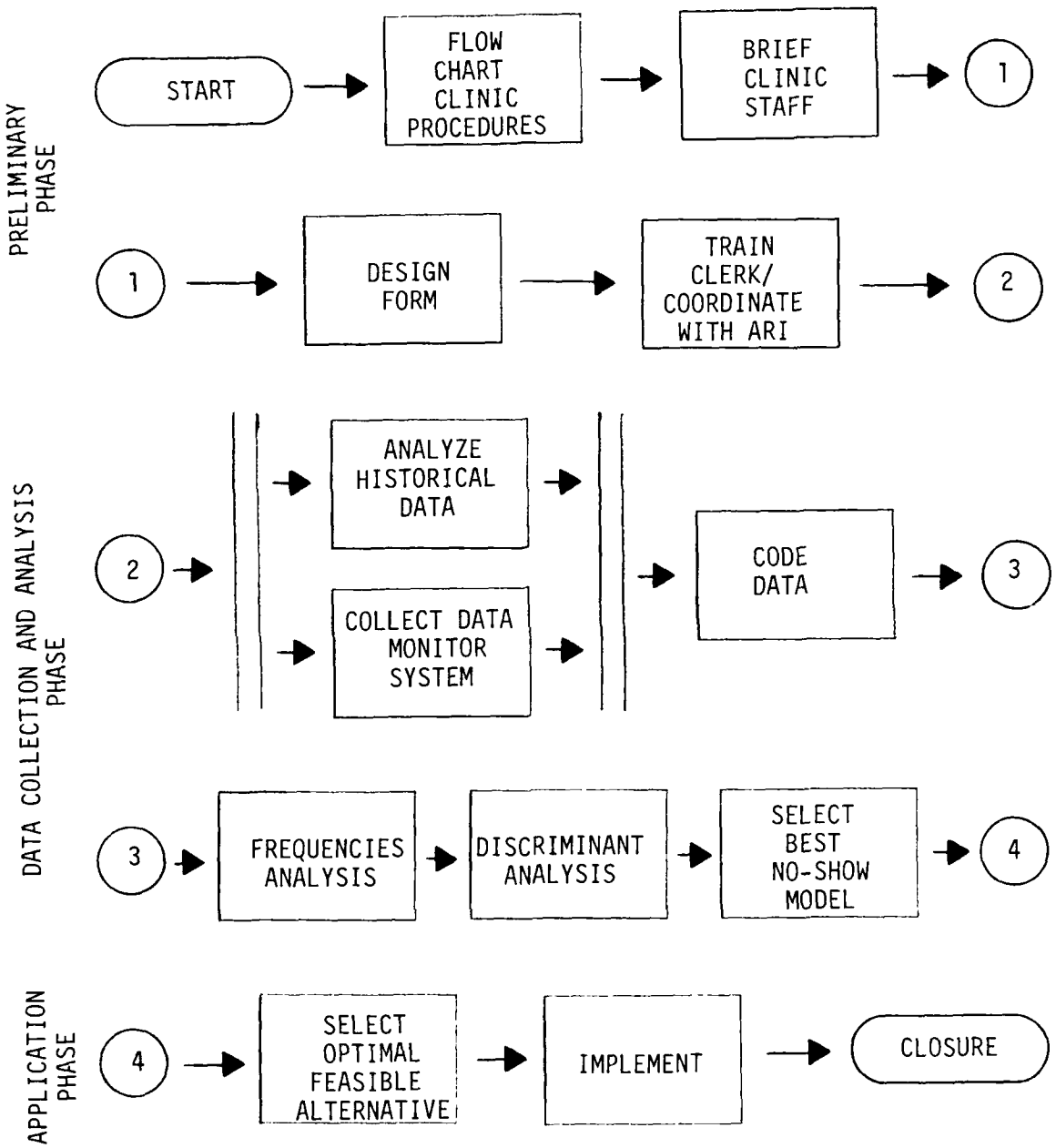

Figure 1. The Research Methodology

The data collection and analysis phase began with the simultaneous collection of data, monitoring of the data collection procedure, and analysis of the historical no-show rate. Periodically, the researcher coded the data to facilitate later analysis by the SPSS program. When sufficient data was collected, it was first analyzed utilizing the SPSS subprogram FREQUENCIES. Following a chi-square analysis of this output, those characteristics which differed most significantly between patients who showed and those who failed to show for their appointments were selected and the subprogram DISCRIMINANT was run. The final step of this phase was a comparison of the DISCRIMINANT model with other models derived throughout the study and the selection of the best model.

The application phase consisted of identifying feasible alternatives for lowering the no-show rate considering fully the implications of the best no-show model emerging from the study. Alternatives were measured against those criteria considered most important and the optimal feasible solution was selected. Finally, the selected alternative was implemented for a thirty-day trial period, the results recorded, and recommendations derived.

FOOTNOTES

[1]Joint Commission on Accreditation of Hospitals, Accreditation Manual for Hospitals (1983) (Chicago: JCAH, 1982), p. 69.

[2]David G. Kleinbaum and Lawrence L. Kupper, Applied Regression Analysis and Other Multivariable Methods (North Scituate, MA: Duxbury Press, 1978), p. 415.

[3]Joel J. Alpert, "Broken Appointments," Pediatrics 34 (July 1964): 128-129.

[4]Paul J. Carpenter, Garry R. Morrow, Andrew C. DelGuadio, and Barry A. Ritzler, "Who Keeps the First Outpatient Appointment?" American Journal of Psychiatry 138 (January 1981): 102-104.

[5]William M. Barron, "Failed Appointments: Who Misses The, Why They Are Missed, and What Can Be Done," Primary Care 7 (December 1980): 565.

[6]Paul B. Hofmann and J. F. Rockert, "Implications of the No-Show Rate for Scheduling OPD Appointments," Hospital Progress 50 (October 1969): 35.

[7]William Shonick and Bonnie W. Klien, "An Approach to Reducing the Adverse Effects of Broken Appointments in Primary Care Systems: Development of a Decision Rule Based on Estimated Conditional Probabilities," Medical Care 15 (May 1977): 419-429.

[8]John V. Dervin, David L. Stone, and Charles H. Beck, "The No-Show Patient in the Model Family Practice Unit," The Journal of Family Practice 7 (June 1978): 1179-1180.

[9]Gene L. Oppenheim, James J. Bergman, and Eugenia C. English, "Failed Appointments: A Review," The Journal of Family Practice 8 (April 1979): 794.

[10]Lawrence F. Nazarian, Judith Mechaber, Evan Charney, and Molly P. Coulter, "Effect of a Mailed Appointment Reminder on Appointment Keeping," Pediatrics 3 (March 1974): 349.

[11]Gordon A. Hagerman, "Testing the Mailed Appointment Reminder in Family Practice," The Journal of Family Practice 7 (January 1978): 200.

[12]Donald S. Shepard and Thomas A. E. Moseley, III, "Mailed vs Telephoned Appointment Reminders to Reduce Broken Appointments in a Hospital Outpatient Department," Medical Care 14 (March 1976): 270-271.

[13]Dale L. Morse, Molly P. Coulter, Lawrence F. Nazarian, and Rudolph J. Napodano, "Waning Effectiveness of Mailed Reminders on Reducing Broken Appointments," Pediatrics 68 (December 1981): 847.

[14]David E. Hildebrandt and Judy M. Davis, "Home Visits: A Method for Reducing the Pre-Intake Dropout Rate," Journal of Psychiatric Nursing and Mental Health Services 13 (September-October 1975): 44.

[15]Richard A. Deyo and Thomas S. Inui, "Dropouts and Broken Appointments: A Literature Review and Agenda for Future Research," Medical Care 18 (November 1980): 1148-1155.

II. DISCUSSION

The Social Work Service Clinic is located in a building complex which, until the opening of a more modern facility in 1958, was Martin Army Hospital. Today, this former hospital is best known as the Home of the National Infantry Museum, but it also accommodates many health-oriented services including the Physical Examination Section, the Community Mental Health Activity, a Well Woman's Clinic, and a Learning Abilities Center. The Social Work Clinic occupies the second floor of one building and is arranged to accommodate patient flow as shown in Figure 2.

Table 1 depicts Social Work Service staffing during the period of the study. The social work officer, captain, was physically located in the main hospital supporting the Department of Family Practice and did not counsel any new patients which were the subjects of this study. Similarly, the two social service assistants, GS-8, were assigned inpatient functions at the main hospital and did not counsel patients included in the study. The secretary-stenographer, GS-5, was of particular importance because this individual interfaced with the patient population and functioned as the appointment clerk and clinic receptionist. In these capacities, the secretary-stenographer was responsible for accomplishing the data

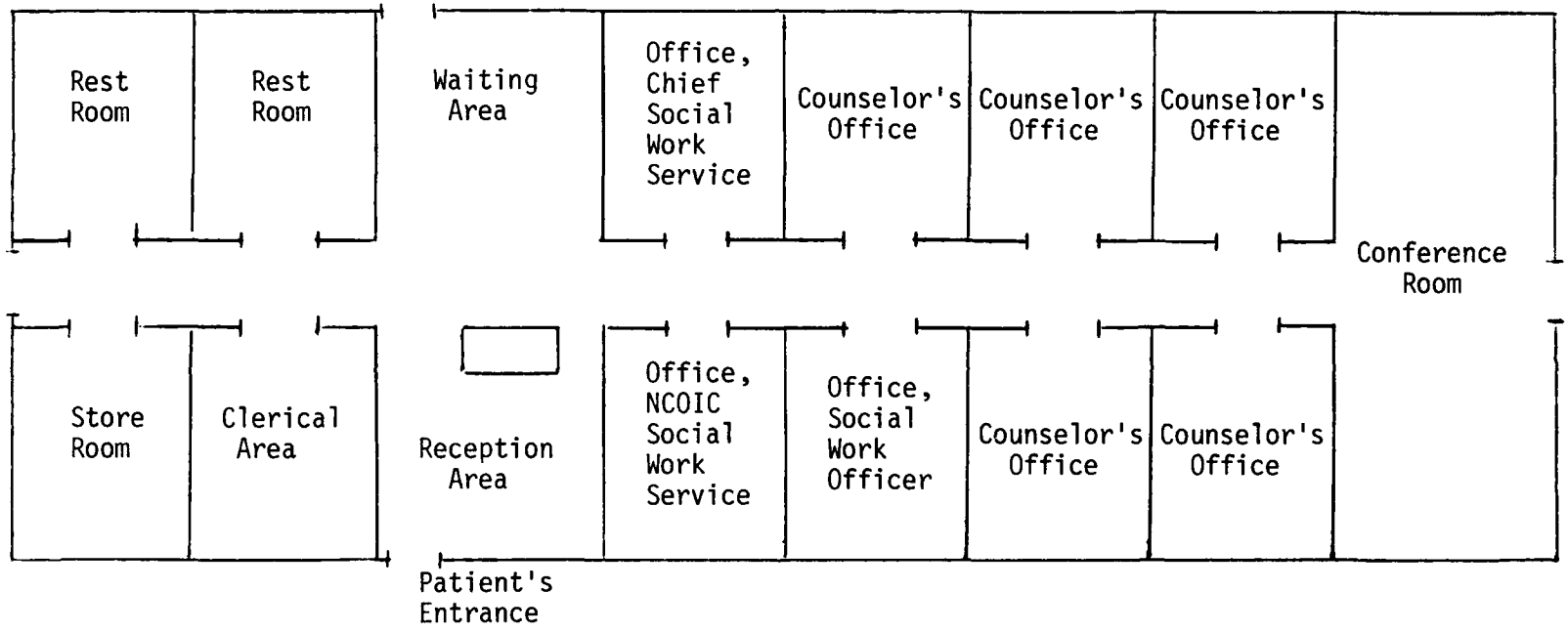

Figure 2. Physical Layout of the Social Work Service Clinic

collection portion of the project.

TABLE 1

SOCIAL WORK SERVICE STAFFING DURING THE STUDY

Position Title	Grade	Assigned
Chief, Social Work Service	Major	1
Social Work Officer	Captain	1
Behavioral Science Specialist (NCOIC)	Sergeant First Class	1
Social Service Assistant	GS-9	2
Social Service Assistant	GS-8	2
Clerk Typist	GS-3	1
Secretary-Stenographer	GS-5	1

Although the population supported by Martin Army Community Hospital is well defined (Table 2) these numbers may not accurately reflect the subpopulation treated at the Social Work Service Clinic because military personnel without dependents are appointed at a separate clinic operated by the Community Mental Health Activity.

TABLE 2

POPULATION SUPPORTED BY MARTIN ARMY COMMUNITY HOSPITAL
(as of February 1983)

Active Duty Military	24,057
Dependents of Active Duty	25,577
Retired Military	9,212
Dependents of Retired and Deceased	19,539
Civilians	8,122
Other Beneficiaries	5,828
TOTAL	92,335

Clinic Appointment Procedures

The preliminary phase began with an examination of the operational aspects of the clinic with special emphasis on appointment-making procedures. The purpose of this examination was to provide a basis for designing a data collection mechanism which would complement the existing system and which would not, of itself, alter patient appointment-keeping behavior. The flow chart at Figure 3 illustrates the patient appointment and treatment system which had been utilized at the clinic prior to the study. Upon receiving a telephonic appointment request, the appointment clerk would first ascertain whether the patient was currently being followed by a member of the Social Work Service staff. Patients being followed were scheduled with their counselor at the next available and agreeable time, and the patient's name was entered in an appointment book maintained by the clerk. If the caller indicated that he or she was not currently being followed, the clerk inquired about the caller's name and telephone number, the appointee's name, and the general nature of the problem. Next, the appointment clerk would determine whether the situation was of such urgency to warrant immediate consultation by asking the caller if he or she would like to speak with a counselor. If so, the clerk would transfer the call to an available counselor and would follow the counselor's instructions regarding scheduling. If not, the clerk would schedule the patient at the next available and agreeable time. When patients reported for appointments,

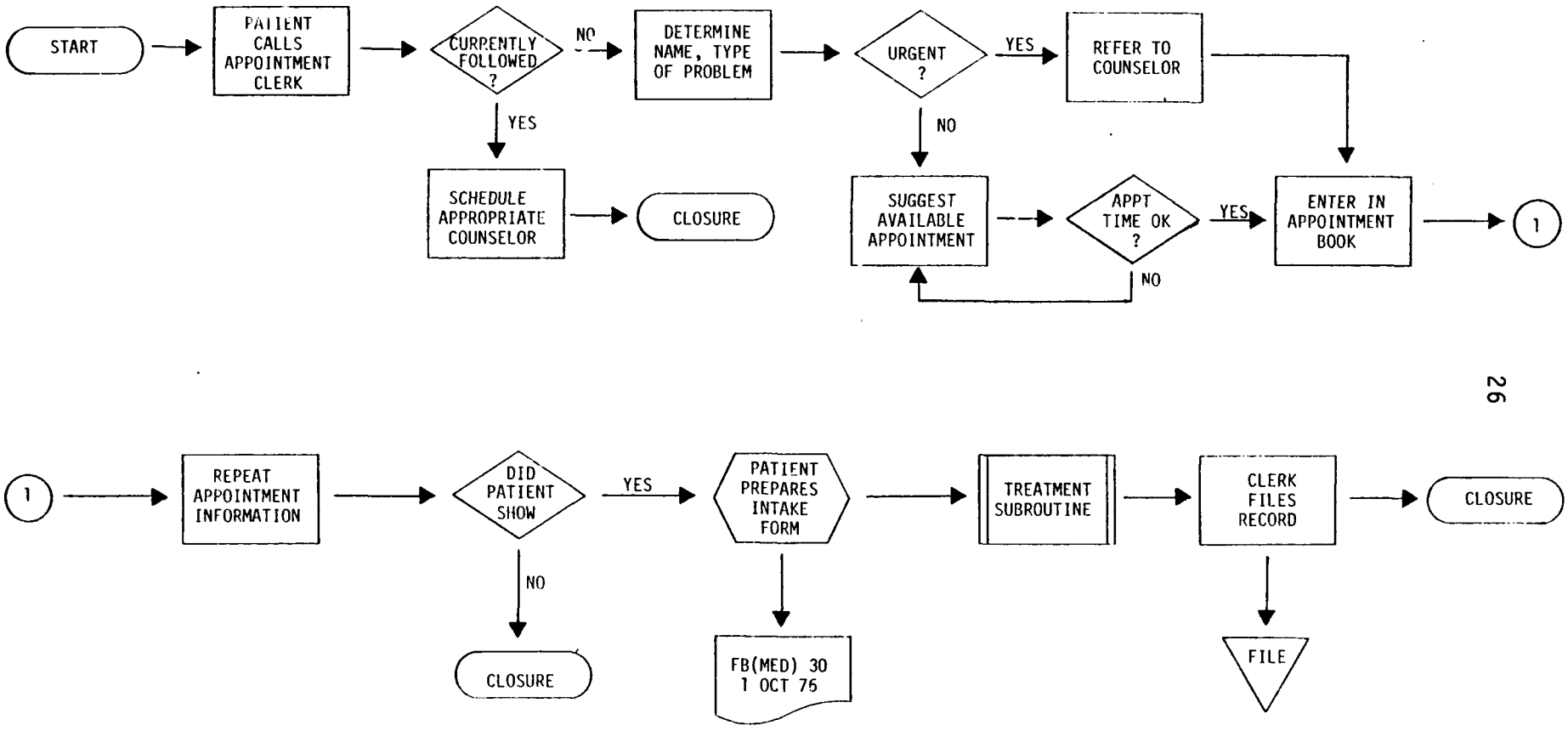

Figure 3. The Existing Patient Appointment and Treatment System

the clerk greeted them, seated them in the waiting area, provided them the Social Work Service Client Information Sheet, FB(MED) Form 30 dated 1 October 1976 (Appendix C), and instructed them to complete the form. No action was taken concerning patients who failed to report for the scheduled appointment.

Identification of Relevant Characteristics

The entire Social Work Service Clinic staff was briefed to assure an understanding of project objectives, methodologies, and potential benefits. The staff enthusiastically endorsed the study and participated as key informants in a discussion to determine which characteristics they felt were most strongly associated with patients who fail to show for appointments. The staff agreed that first-time appointees constituted the majority of failed appointments. Following the briefing, the Social Work Service chief and the researcher consolidated the recommendations of the group and determined the seventeen variables which would be measured during the data collection and analysis phase of the project.

Many of the factors thought to be significantly related to no-show behavior were similar or identical to those previously investigated in the literature while others were unique to the military setting and had not been studied previously. In addition to the dependent variable of show/no-show behavior, nine variables were selected which are related to the patient's demographic characteristics and seven which are related to the

patient's clinical characteristics. Appendix D lists the variable to be measured, the measurement criteria for that variable, and the collective *a priori* notion of the Social Work Service Clinic staff regarding the effect of that variable on no-show behavior. Certain characteristics such as racial status were considered but rejected as variables because, although possibly related to no-show behavior, they could serve no practical application in lowering the no-show rate. Also discussed at the staff briefing and agreed upon were a number of key definitions which would be observed throughout the study. A summary of those definitions is at Appendix E.

Data Collection Technique

The data collection technique was designed to interface with the existing appointment procedure in such a way that, from the patient's viewpoint, nothing had changed until the patient proved to be either a show or a no-show. This condition was critical because, if the data collection technique itself could potentially affect attendance behavior, a control group would be required to test for that influence. For this study, a control group was not feasible because the anticipated volume of newly appointed patients and time constraints would not support the establishment of an additional group.

In order to collect and record data pertaining to the seventeen variables which had been identified, it was necessary to design and incorporate a preprinted form into the research design. The Social Work Service Client Information Sheet

(Appendix C), which the clinic staff had been using to obtain information about the patient prior to the actual appointment, provided an excellent opportunity to implement a similar form which would also support the study. The staff had expressed dissatisfaction with the design and content of the existing information sheet and cooperated in the design of a new form, the Social Work Service Intake Interview Information Sheet (Appendix F), which served the dual purposes of furnishing information to the counselor and capturing data required for the study.

Figure 4 illustrates the patient appointment and treatment system as modified by the research design. The system is identical to the previous system from the telephonic receipt of the appointment request to that point where the patient either shows or fails to show for the appointment. The data collection procedure was specifically designed to assure that during the appointing process the remarks of the appointment clerk were identical to those used in the past. However, certain actions of the clerk, not detectable to the caller during the telephonic conversation, were different. When the caller identified himself as a new patient by indicating that he was not currently being followed at the clinic, the clerk initiated Part I of the revised Intake Interview Information Sheet and completed that portion of the form as information became available. At the termination of the call, the clerk transferred the information to the appointment book. From the patient's point of view, the same information was collected in precisely the same manner as

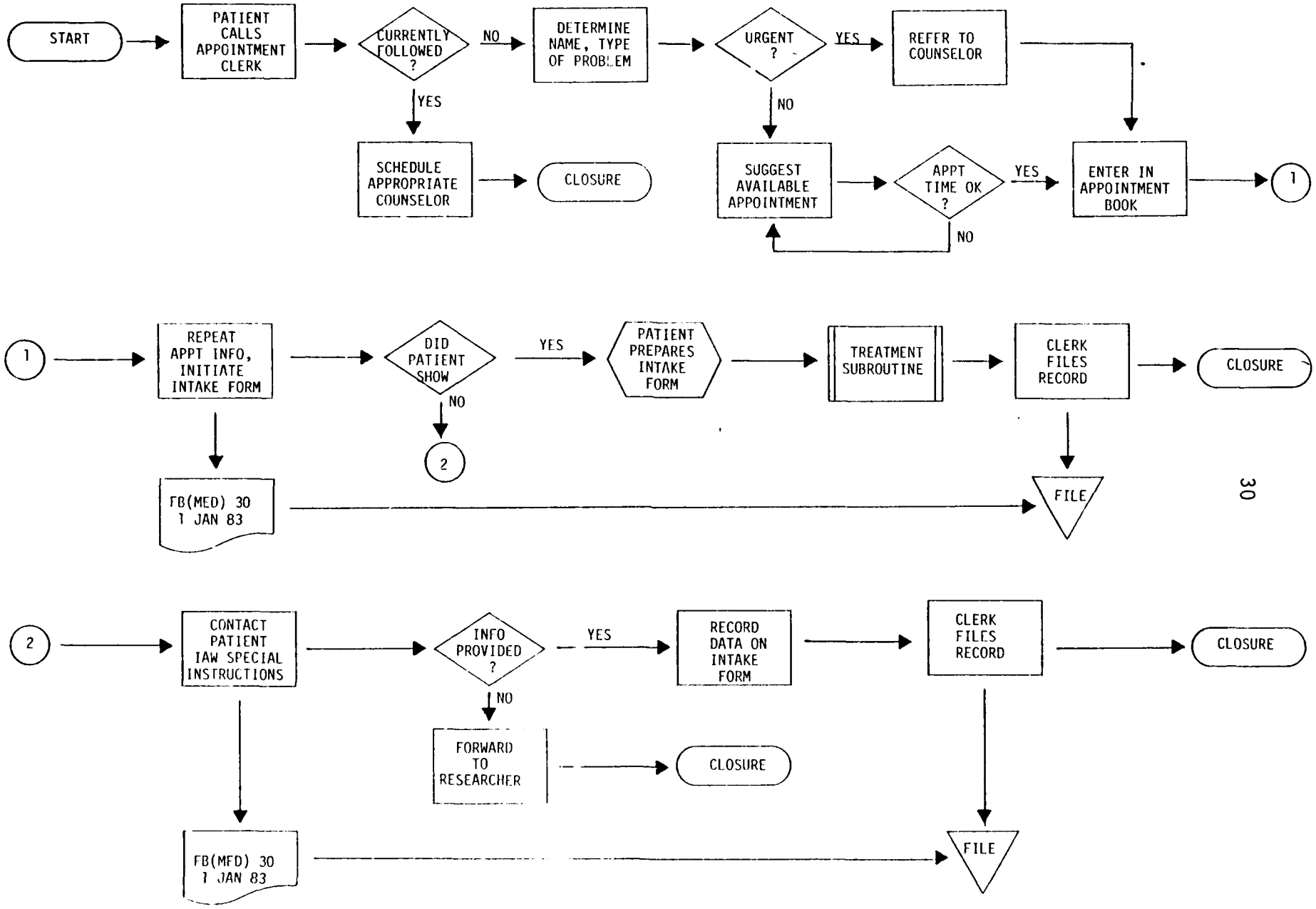

Figure 4. The Modified Patient Appointment and Treatment System

under the previous system. Finally, the clerk added the patient's name in numerical sequence to a control log which was maintained for newly appointed patients in support of the study. The control log (Appendix G) provided the researcher a means of tracking newly appointed patients and a convenient means of periodically coding data pertaining to the variables being studied.

Patients who reported for their appointment were asked to complete Part II of the form which was reviewed by the receptionist for completeness and referred to the counselor. Following the appointment, the Intake Interview Information Sheet was placed in that patient's record and maintained in a file. For patients who failed to show for their appointment or cancelled within twenty-four hours, the clerk annotated the control log and the Intake Interview Sheet. Next, the receptionist attempted to contact the patient telephonically to retrieve the required data in accordance with the instructions at Appendix H. These instructions were designed to encourage a favorable response through a consistently applied dialogue which would not, of itself, influence the individual's response. All no-show patients were successfully contacted and all agreed to cooperate with the study by providing the information required. The receptionist forwarded four information sheets to the researcher in accordance with the instructions because she had not successfully contacted those patients within the three days specified. One of the four had indicated no telephone number and one indicated the wrong number, neither of which were listed

in the telephone book, but both of which were retrieved from the patient's outpatient medical record maintained at Martin Army Community Hospital. The researcher contacted all four patients, followed the same dialogue as prescribed for the receptionist, and retrieved the data.

The Historical Clinic No-show Rate

Limited data in the form of monthly workload reports were available in the Social Work Clinic and were analyzed to produce several models of no-show behavior based on historical clinic experience. The data available was limited to calendar year 1982 and was not of sufficient detail to permit an analysis for time periods of less than one month. The definitions of terms on these reports, particularly the term "no-show", did not conform to the context of this study, and it was necessary to add cancellations to the reported "no-shows" in order to obtain the number of no-shows consistent with the parameters of this study. Furthermore, although the total number of "no-show" patients had been clearly recorded, the number who were also newly appointed patients was not retrievable. Therefore, in analyzing the historical data, the staff's impression that most (about three-quarters) of the "no-shows" were new patients was used as a basis for calculating an estimated number. Similarly, although the total number of cancellations was recorded, neither the number attributable to new patients nor the number initiated by the clinic was indicated. An estimated number of cancellations initiated by new patients was derived by applying

the staff's opinion that about one-half of the total cancellations were caused by newly appointed patients within twenty-four hours of the scheduled appointment.

Based on these assumptions, the monthly, quarterly, and annual no-show rates for new patients during 1982 were calculated as displayed at Table 3. During the year, an average of sixty-eight new patients per month were scheduled at the clinic. New patients accounted for nearly 25 percent of all patients scheduled and an estimated 26.3 percent of the new patients either failed to show or cancelled within twenty-four hours of their appointment. These findings only partially support the preliminary data collected by the Social Work Service chief, and the researcher was not able to confirm the initial contention that, from January to October 1982, the no-show rate had averaged 49 percent.

Figure 5 is a graph of monthly no-show rates plotted against time to show seasonal fluctuations. From the graph it is evident that the rate fluctuated greatly during the first quarter of the calendar year, steadied at a relatively low level during the second quarter, rose during the third quarter, and fluctuated from very high to very low during the fourth quarter. In addition to the very general no-show models based strictly on annual, quarterly, and monthly no-show rates, six other models were created from the 1982 data. Linear regression equations were derived from various combinations of data to determine whether a linear relationship existed which would accurately

TABLE 3

MONTHLY AND QUARTERLY NO-SHOW RATES FOR THE SOCIAL WORK SERVICE CLINIC
BASED ON AN ANALYSIS OF DATA FOR CALENDAR YEAR 1982

	Total Clinic Visits	Total New Patients	Total No-shows	Estimated New Patient No-shows	Monthly No-show Rate (All Patients)	Monthly No-show Rate (New Patients)	Total Cancellations	Estimated New Patient Cancellations	Monthly Cancellation Rate (All Patients)	Monthly Cancellation Rate (New Patients)	Monthly No-show/Cancellation Rate (New Patients)	Monthly Combined No-show/Cancellation Rate (New Patients)	Quarterly Combined No-show/Cancellation Rate (New Patients)
January	240	42	11	8	4.58%	19.05%	20	10	8.33%	23.81%	42.86%		
February	276	64	13	10	4.71%	15.63%	6	3	2.17%	4.69%	20.32%		
March	281	61	14	10	4.98%	16.35%	21	10	7.47%	16.39%	49.09%	30.54%	
April	243	74	13	10	5.35	13.51%	9	4	3.70%	5.41%	18.92%		
May	246	80	12	9	4.88%	11.25%	12	6	4.88%	7.50%	18.75%		
June	309	81	9	7	2.91%	8.64%	13	6	4.21%	7.41%	16.05%	17.87%	
July	247	69	24	18	9.72%	26.09%	7	3	2.83%	4.35%	30.44%		
August	319	83	22	16	6.90%	19.28%	12	6	3.76%	7.23%	26.51%		
September	365	66	14	10	3.84%	15.15%	26	13	7.12%	19.70%	34.85%	30.28%	
October	241	49	26	19	10.79%	38.78%	10	5	4.15%	10.20%	48.98%		
November	268	71	18	13	6.72%	18.31%	10	5	3.73%	7.04%	25.35%		
December	249	74	12	9	4.82%	12.16%	9	4	3.61%	5.41%	17.57%	28.35%	
ANNUAL TOTALS	3284	814	188	139	5.72%	17.08%	155	75	4.72%	9.21%	26.29%		

describe clinic no-show patterns. Figure 6 describes the variables investigated and the linear equations derived utilizing the least-squares technique. An evaluation of the regression equations by performing a t test on the correlation coefficients, however, leads to the conclusion that none of these equations show a significant linear relationship to describe the no-show patterns of the clinic during 1982.

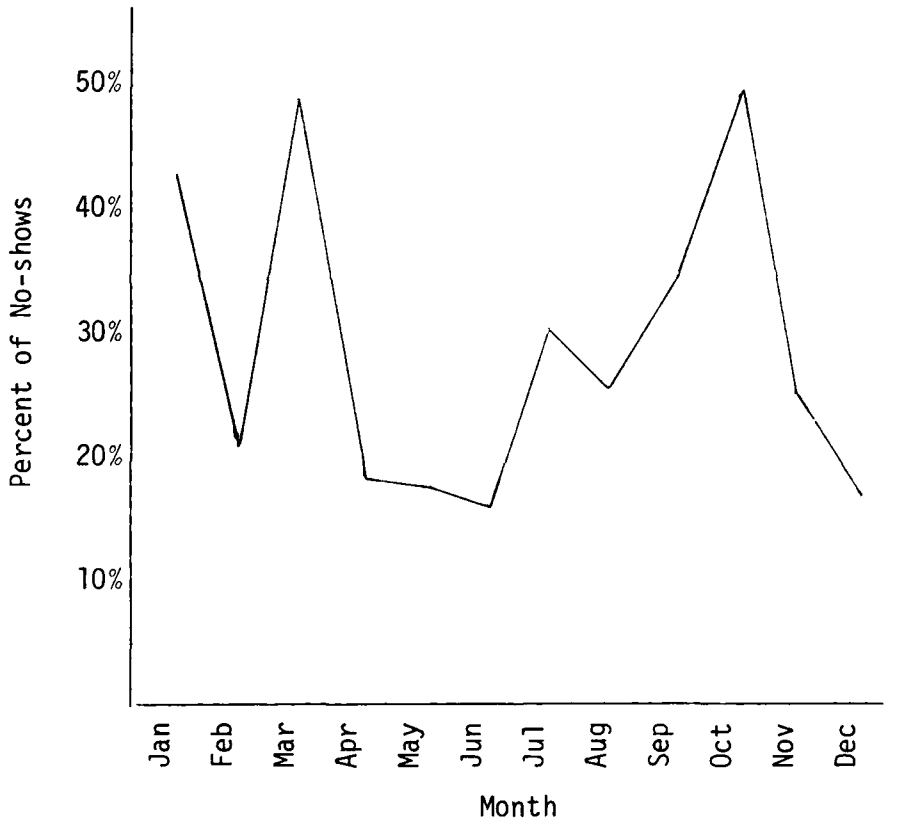

Figure 5. Monthly No-show Rates for Newly Appointed Patients from 1982 Clinic Workload Data

Dependent Variable	Independent Variable	Linear Equation	Correlation Coefficient
Number of Monthly No-shows (New Patients)	Number of Monthly New Patient Visits	Y=26.10 - 0.12X	-0.37
Number of Quarterly No-shows (New Patients)	Number of Quarterly New Patient Visits	Y=61.56 - 0.04X	-0.12
Number of Quarterly No-shows (New Patients)	Time (Quarter of the Year)	Y=44.50 + 3.60X	0.47
Number of Monthly No-shows (New Patients)	Time (Month of the Year)	Y=15.74 + 0.32X	0.28
No-show Rate for New Patients	Time (Quarter of the Year)	Y=25.30 + 0.58X	0.13
No-show Rate for New Patients	Time (Month of the Year)	Y=31.79 - 0.41X	-0.12

Figure 6. Linear Regression Equations Derived from Historical Data

A chi-square analysis was performed to compare the annual, quarterly, and monthly no-show rates at the 95 percent confidence level. A comparison of observed quarterly no-shows and those expected by applying the annual no-show rate (26.29 percent) to the number of new patients seen each quarter showed that the quarterly rate is significantly different, i.e., more precise (χ^2=9.12,df=3,p<.05). A similar comparison between monthly no-shows and those expected from the quarterly no-show rate showed that the monthly rate is not significantly different than the quarterly rate (χ^2=16.08,df=11,p>.1). Therefore, it was concluded that of all the models derived from the 1982 data, the quarterly no-show rate provides the best clinic-based model of

no-show behavior.

Descriptive Analysis of the Data

Data was collected for new patients appointed to the Social Work Service Clinic during the period 6 January through 8 April 1983. Using the Social Work Service Intake Interview Information Sheet as a source document, the researcher coded variables as described in Appendix D, transferred the data to computer punch cards, and entered the data records, data definition cards, and task definition cards into the SPSS subprogram FREQUENCIES. The output from this subprogram was a variety of descriptive statistics and frequency distribution tables for all patients appointed during the study, for the group who showed for their appointments, and for the group who did not show. A summary of this analysis is at Appendix I. Included are the results of chi-square analyses testing for the significance of differences between the show and the no-show groups with respect to the variables measured.

The summary statistics reveal a great deal about the Social Work Service Clinic and the population served. While waiting time ranged from zero to nine days, the average patient waited less than three days for an appointment, including weekends when the clinic is closed. 87 percent of the clients had never used the Fort Benning Social Work Service Clinic before and two-thirds had never used any form of social services counseling in the past. Nearly one-half of the patients requesting initial appointments were referred from an outpatient clinic at Martin Army Community

Hospital and most were scheduled with one of the civilian counselors employed at the clinic. Most of the patients transported themselves to the clinic from residences located apart from the Fort Benning military reservation. Compared to the population profile described at Table 2, the dependent population visited the clinic approximately twice as frequently as expected, a situation explained by the clinic policy of not treating active duty soldiers without dependents. Finally, the summary statistics reveal that, although the clinic staff believed financial difficulties would constitute a major problem type for new patients, none of the patients included in the study classified their problem as a financial one.

Chi-square analyses for differences between the show and no-show groups were performed to determine which patient characteristics contained the greatest variability and to identify the characteristics which would probably have the greatest impact on the two-group discriminant analysis. The only statistically significant relationship pertained to the delay between the appointment request and the date of the scheduled appointment. The chi-square analysis revealed that patients who were required to wait longer for their appointments failed to show more frequently than those who were appointed more promptly. This finding is consistent with results generally reported in the literature. Three other characteristics (referral source, problem types, and sponsor's rank) displayed results which were not in themselves significantly correlated with show or no-show

behavior. The results of the chi-square analyses, however, did indicate that the combined effect of these variables might reach statistical significance when included in the SPSS discriminant analysis.

Discriminant Analysis of the Data

The objective of the discriminant analysis technique is to develop a decision rule in the form of a discriminant function which will serve the dual practical uses of analyzing known population samples for characteristics consistent with group membership and classifying unknown population samples in order to predict likely group membership. The decision rule is derived mathematically by weighting and forming a linear combination of the variables collected by the researcher to form a discriminant function of the form

$$L = B_1X_1 + B_2X_2 + \ldots + B_pX_p$$

where L is the value of the discriminant function, X is the measured value of each observed variable, and B is the weighting coefficient associated with each of the p discriminating variables. The optimal discriminating function is that which optimizes this equation in such a way that the values computed for members of each group are as statistically distinct as possible. One weakness of discriminant analysis is that the researcher must determine in advance those groups and variables to be considered. These preliminary decisions made by the researcher may not, in fact, provide the most relevant input for

the analysis and may not lead to the most conclusive results. Another weakness is that this method relies on a greater variation of L between groups than among group members, a condition which may not exist and which may lead to inconclusive results. The strength of discriminant analysis is that since the data collected consists of mutually correlated variables, the most accurate analysis will be derived from this technique which considers combinations of intercorrelated variables rather than one variable at a time.[1]

The SPSS subprogram DISCRIMINANT was used to accomplish the analysis function in a stepwise manner whereby the single best discriminating variable was selected according to the parameters described below, paired with the other available variables one at a time and, provided the specified selection criteria were achieved, the best combination of two variables was entered into the discriminant function. This step-by-step procedure was repeated with that combination of variables continually selected which was best able to improve the discriminating value of the function. The selection criterion used for determining whether to add a new combination of variables to the function was the overall multivariate F ratio to test the differences among the group centroids. Group centroids are the mean discriminant scores for each group and, as the distance between group centroids increases, the discriminating power of the function increases. That variable which maximized the F ratio was selected for inclusion as long as its partial F ratio exceeded a value of

1.0. Therefore, when a variable was selected for entry into the discriminant function, it added significantly to the amount of separation between the group centroids.[2]

In addition to the F-to-enter ratio described above, several other parameters were incorporated into the analysis. The F-to-remove value was also established as 1.0 and allowed for the possibility that, as the stepwise procedure continued, variables previously selected might lose their discriminating power due to their information being contained in another combination of variables. The tolerance level was set at .001 to assure the inclusion of only those variables which would be compatible with the internal mathematical program and which would not result in large rounding errors in the discriminant coefficients. Finally, a maximum of ten steps was specified to assure that the stepwise procedure would be repeated sufficient times to produce the most valid discriminant function.[3]

The complete printed output from the subprogram DISCRIMINANT is at Appendix J. Since only two groups had been defined in the research design, i.e., patients who showed for their appointments and those who failed to show, only one discriminant function could be derived. A random number generating feature of the SPSS program was used to divide the data evenly between the analysis portion and a holdout portion which would be used to test the adequacy of the discriminating model produced. In order to comply with the condition that the number of cases analyzed should equal at least ten times the number of variables, five

of the patient characteristics were selected as candidates for inclusion in the discriminant function primarily on the basis of the chi-square analyses described earlier. The five variables selected were: days delay awaiting the appointment (DELAY), referral source (REFERBY), military status (MILSTAT), problem type (PROB), and sponsor's rank (SPONRANK).

At step one of the discriminant analysis, the variable DELAY was selected as the single best discriminator between shows and no-shows. At this point, only SPONRANK in combination with DELAY contained an F-to-enter value exceeding the minimum of 1.0. After SPONRANK was included in the discriminant function at step two, none of the remaining variables when combined with SPONRANK and DELAY added significantly to the separation of centroids for the show and no-show groups. At this point, the discriminant analysis terminated and the coefficients shown in Table 4 were calculated.

TABLE 4

DISCRIMINANT FUNCTION COEFFICIENTS FROM THE SPSS ANALYSIS OF DATA

Variable	Standardized Discriminant Function Coefficients	Unstandardized Discriminant Function Coefficients	Classification Function Coefficients	
			Show	No-Show
DELAY	0.74321	0.3118804	0.4463719	0.7173132
SPONRANK	-0.70399	-0.2636750	0.8917860	0.6627225
(Constant)		0.5975262	-4.209511	-3.858131

The three sets of discriminant equations which can be created from these coefficients are equivalent. The standardized discriminant function

$$L=0.74321(DELAY)-0.70399(SPONRANK)$$

is derived in such a way that, over all fifty-four cases which were selected randomly for analysis, the discriminant values have a mean of zero and a standard deviation of one. Therefore, the score for any single case represents the number of standard deviations that case is away from the mean of all cases. The coefficients in the standardized discriminant function are of great analytic value to the researcher because, when the sign is ignored, each coefficient represents the relative contribution of its associated variable to the discriminant function.[4] In this case, the variables DELAY and SPONRANK contribute approximately equally to the function.

The unstandardized discriminant function

$$L=0.5975262+0.3118804(DELAY)-0.2636750(SPONRANK)$$

is useful because the researcher can easily multiply the coefficients by values of the raw data to obtain discriminant scores. After adding the constant to adjust for grand means, the score obtained is identical to the one derived from standardized coefficients and standardized data. The numerical values of the coefficients, however, bear no relationship to the relative importance of the variables since they have not been adjusted for measurement scales and variability.[5]

The two classification functions

$$L=-.4209511+0.4463719(DELAY)+0.8917860(SPONRANK)$$

and

$$L= 3.858131+0.7173132(DELAY)+0.6627225(SPONRANK)$$

are useful for classifying cases as likely shows or no-shows. By calculating the show score from the first equation and the no-show score from the second equation, the researcher can easily classify the case by selecting the group with the higher computed score.[6]

To test the adequacy of the discriminant function, discriminant scores were calculated for each of the fifty-four cases which were used to derive that function and separately on the forty-seven cases which were not used. The cases were then categorized as shows or no-shows by placing them in the group for which their score indicated the greatest probability of membership. The results of these classification tests of the discriminant function are shown in Tables 5 and 6.

TABLE 5

CLASSIFICATION RESULTS FOR CASES USED IN THE DISCRIMINANT ANALYSIS

Actual Behavior	Predicted Behavior	
	Show	No-show
Showed (39 patients)	23(59.0%)	16(41.0%) Error
Did not Show (15 patients)	5(33.3%) Error	10(66.7%)
Percent of Patients Correctly Classified: 61.11%		

TABLE 6

CLASSIFICATION RESULTS FOR CASES NOT USED IN THE DISCRIMINANT ANALYSIS

Actual Behavior	Predicted Behavior	
	Show	No-Show
Showed (35 patients)	27(77.1%)	8(22.9%) Error
Did not Show (12 patients)	6(50.0%) Error	6(50.0%)
Percent of Patients Correctly Classified: 70.21%		

The results of these classification tests require interpretation. The test on data previously used to derive the discriminant function (Table 5) is not considered a good evaluation of the function for adequacy in predicting behavior within the general population because bias is forced into the function as it is mathematically fitted to that particular data set. A much stronger test for the adequacy of the function is to categorize the holdout sample (Table 6) and compare predicted to actual group membership. In this study both tests were used and the results were highly unusual. For the cases which had been used in the analysis, only 61.11 percent were correctly classified. For the holdout sample, however, 70.21 percent were correctly classified, an improvement which can be explained by the relatively small sample size and chance in the random selection of cases for analysis. One factor limiting the correct classification of cases is that the group centroids for the show and no-show groups were not well separated and, when plotted, discriminant scores for shows and no-shows overlapped greatly.

In evaluating the adequacy of the clinic no-show model derived from the two-group discriminant analysis of data pertraining to patient characteristics, an important distinction must be made. If the research problem were to derive that model which would most accurately describe all patient behavior, then this model and the model based on quarterly clinic no-show rates would be comparable with both models correctly classifying patients approximately 70 percent of the time. In the case of the clinic-based model, the analyst would simply predict that all patients would show and, depending upon the quarter of the year, would be 69.46, 82.13, 69.72, or 71.65 percent accurate. The research problem, however, is not to describe all patient behavior, but to describe patient no-show behavior. Therefore, the patient characteristic model derived from discriminant analysis is clearly superior because it correctly predicts 50 percent of those patients who would fail to show for the scheduled appointment, while, at best, clinic-based model can only predict 30.54 percent of the no-shows by assuming that all patients would fail to show during the first quarter. Therefore, based on the results of the classification test on the holdout sample, the patient characteristic model is preferable for identifying the likely no-show patient and directing intervention to reduce the no-show rate.

Additional Models Derived from the Data

In addition to the models previously described, the results of the two-group discriminant analysis suggested three other

models of no-show behavior for newly appointed patients at the Social Work Service Clinic. One model was derived by applying the unstandardized coefficient discriminant function to all possible combinations of sponsor's rank and days delay, calculating the discriminant scores, and identifying as no-shows those cases with scores in excess of 0.19305 (the mean of the group centroids). This model is displayed at Figure 7 with critical discriminant scores indicated. All combinations which fall below the stepping-stone line should be predicted as no-shows. An almost identical model, not shown, can be derived by calculating the mean (0.3412) and standard deviation (0.9480) of the discriminant scores for all twenty-seven no-shows (one no-show case was missing SPONRANK data and could not be used in the analysis) and calculating an 80 percent confidence interval within which most no-show cases should appear. The lower limit of this confidence interval prescribes that cases with a calculated discriminant value exceeding 0.1843 should be classified as no-shows. This value is so close to the cutoff value prescribed in the previous model that the model derived from the 80 percent confidence interval is adequately portrayed by Figure 7. To test the adequacy of this model, the twenty-seven actual no-shows were plotted and it was determined that the model correctly identified seventeen, or 60.71 percent. Not only does this model represent an improvement in the level of prediction successes, but it also provides a far more practical decision-making tool for the clinic manager and appointment clerk than

does the discriminant equation alone.

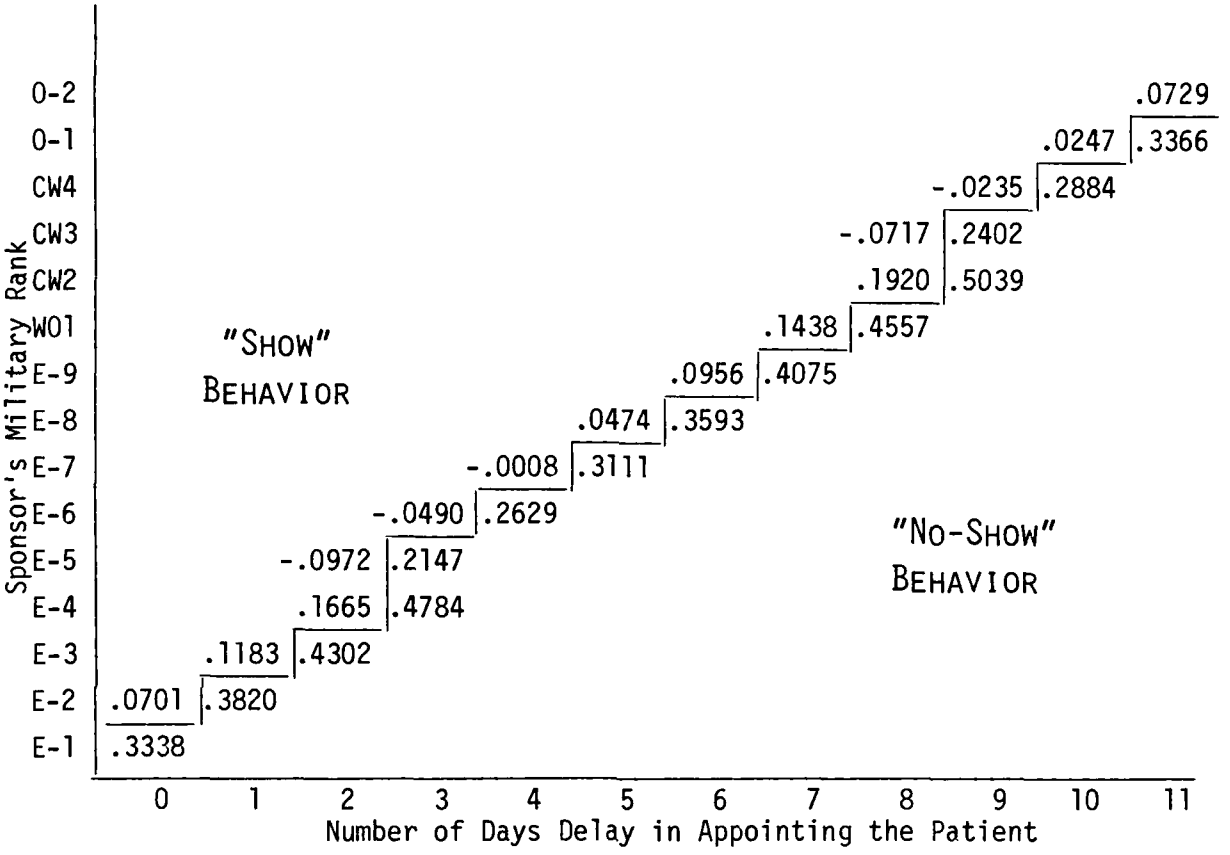

Figure 7. A Stepping-stone Model for Describing No-Show Behavior for Newly Appointed Patients of the Social Work Service Clinic

The final model suggested by the results of the discriminant analysis was a scatter diagram of the twenty-seven no-show cases as shown at Figure 8. A visual inspection of this diagram revealed that twenty-one of the no-shows, or 81 percent, fall within the parameters of sponsor's rank between E-4 and E-7 and delays of two days or greater. Not only did this model best predict no-show behavior, but it also presented the simplest decision-making tool for use by clinic personnel.

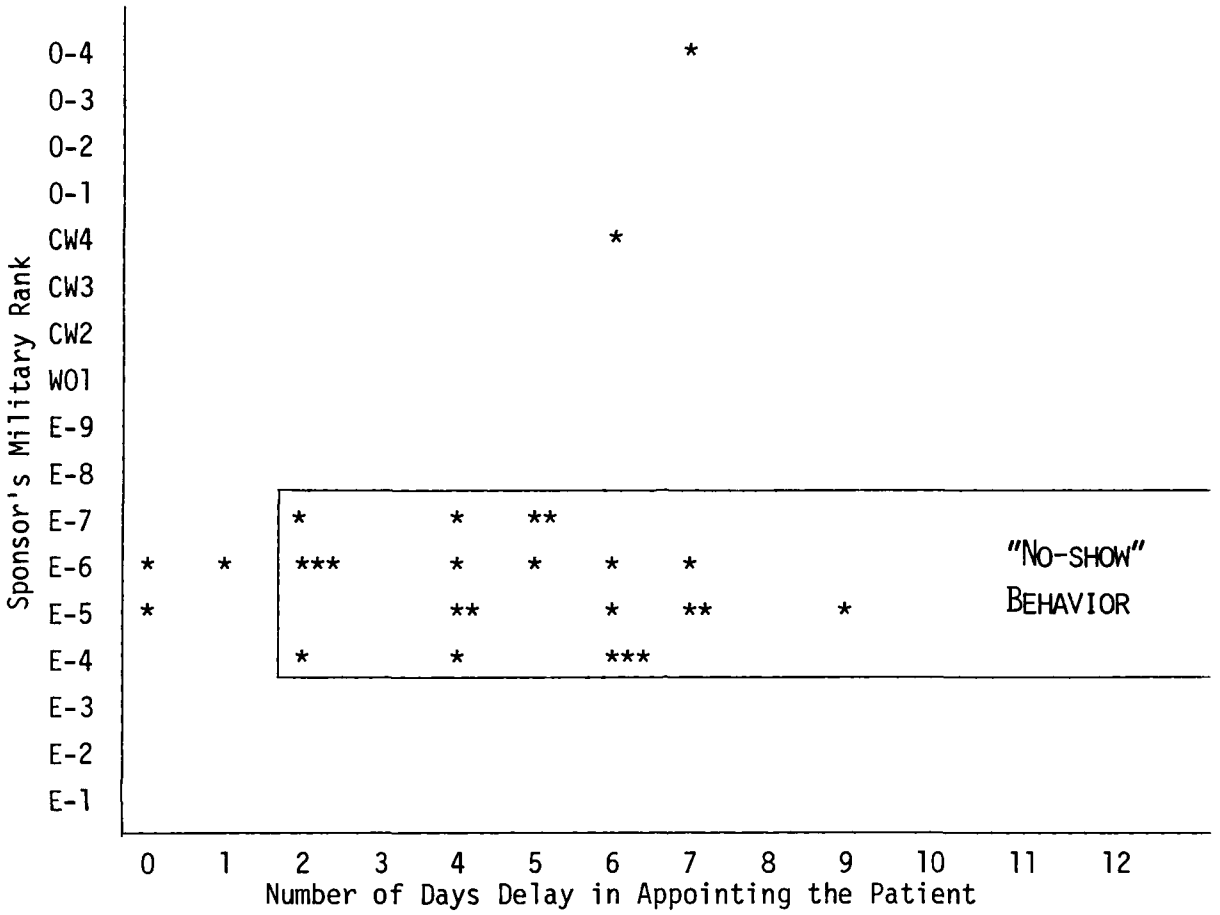

Figure 8. A Scatter Diagram Model for Describing No-Show Behavior for Newly Appointed Patients at the Social Work Service Clinic

The Optimal Feasible Alternative for Reducing the Clinic No-Show Rate

The researcher and the Social Work Service Clinic chief discussed the implications of the best no-show model emerging from the study, identified feasible approaches for reducing the occurrence of that phenomenon, and selected the optimal feasible alternative to be implemented. The results of the study suggested six alternatives for reducing the no-show rate for newly

appointed patients. The first approach was to selectively overbook those patients identified by the model as comprising the majority of clinic no-shows. Mailed and telephonic reminders were considered as separate alternatives with the provisions that telephonic reminders would be used only for patients prescribed by the model and that mailed reminders would be used for those patients only if the delay exceeded three days. The fourth alternative allowed for flexible scheduling where, for non-crisis patients, the appointment clerk would use the model to systematically reserve earlier appointment spaces for appointees with lower ranking sponsors by scheduling those with higher ranking sponsors further out. In conjunction with this procedure, the appointment clerk would transfer all new callers to a counselor for a telephonic intake interview during the appointing process. The fifth alternative was identical to the fourth except that only callers prescribed by the model would be transferred to a counselor for the intake interview. The final alternative was to take no action and accept the high no-show rate for newly appointed patients.

Following the identification of feasible alternatives, the most relevant criteria for evaluating those alternatives were selected. The cost of implementing the alternative was considered subjectively from the standpoint of additional costs imposed and the cost of other tasks not done or delayed. The time required to train the staff and routinely accomplish the alternative was evaluated. Staff acceptance was considered

from the viewpoint of the full-time counselors at the clinic and the impact of the alternative on staff work requirements and morale. Patient acceptance included a consideration of a "caring" image communicated to the patient. The change in quality of care was evaluated by considering the guidance provided in the JCAH quality assurance standard for ambulatory care. Finally, consideration was given to how each alternative would affect the workload or the number of patients treated at the clinic.

The payoff matrix at Table 7 was used to analyze each alternative in terms of the criteria selected. Alternatives were ranked in numerical order according to how well each criterion would be accommodated by that alternative with the lowest number reflecting the best performance. For example, considering the first criterion of cost, it was determined that the status quo would incur no additional cost while mailed reminders would incur the most cost. Considering all six criteria, overbooking emerged as the weakest alternative, followed closely by the status quo. Mailed and telephonic reminders showed some advantages, but the alternatives combining flexible scheduling and telephonic intake interviews performed best against the criteria selected. The optimal feasible alternative was the flexible scheduling of non-crisis patients in conjunction with telephonic intake interviews for patients with sponsor's rank between E-4 and E-7 and two or more days delay.

TABLE 7

A COMPARISON OF SIX ALTERNATIVES TO REDUCE THE NO-SHOW RATE FOR NEW PATIENTS APPOINTED AT THE SOCIAL WORK SERVICE CLINIC

Criteria	Alternative 1 Overbook	Alternative 2 Mailed Reminders	Alternative 3 Telephonic Reminders	Alternative 4 Flexible Scheduling, Intake All	Alternative 5 Flexible Scheduling, Intake Some	Alternative 6 Status Quo
Cost	3	6	5	4	2	1
Time/Training Required	5	2	6	3	3	1
Staff Acceptance	6	1	1	4	3	5
Patient Acceptance	6	4	1	2	2	5
Quality of Care	5	3	3	1	1	6
Workload Accomplished	1	5	4	2	3	6
TOTALS	26	21	20	16	14	24

Implementation of the Optimal Feasible Alternative

The application phase of the study consisted of implementing the selected alternative for a period of thirty days and recording the results. Prior to implementation, the Social Work Service chief and the researcher prepared the instruction sheet at Appendix K and briefed the appointment clerk to assure her understanding of how to appoint patients under the flexible appointment system and which patients to refer for a telephonic intake interview. Also, the general format of the telephonic intake

interview was discussed and the chief briefed all social workers on that procedure. The format itself was flexible, but in all cases was directed towards rapport building. The counselor asked questions of the caller to determine the nature of the problem, the expectations of the individual, what other attempts had been made to resolve the problem, and whether the problem should be handled at the Social Work Service Clinic or referred elsewhere.

During the period 20 April through 19 May 1983, thirty-three new patients were appointed at the clinic. Of these, fourteen were referred to a counselor for a telephonic interview in accordance with the implementation instructions. All other patients were either appointed in less than two days or indicated a sponsor's rank outside the range E-4 to E-7. During this period, the clinic experienced three no-shows (9.1 percent), including one cancellation within twenty-four hours of the scheduled appointment. In addition, three patients cancelled more than twenty-four hours before the appointment and those appointment spaces were subsequently filled. Compared to patient behavior during the previous three-month period of the study, the decrease in the no-show rate is significant ($X^2=4.77, df=1, p<.05$).

FOOTNOTES

[1]David G. Kleinbaum and Lawrence L. Kupper, Applied Regression Analysis and Other Multivariable Methods (North Scituate, MA: Duxbury Press, 1978), pp. 414-420.

[2]Norman H. Nie, C. Hadlai Hull, Jean G. Jenkins, Karin Steinbrenner, and Dale H. Best, Statistical Package for the Social Sciences (New York: McGraw-Hill, 1975), pp. 434-448.

[3]Ibid., pp. 453-454.

[4]Ibid., p. 443.

[5]Ibid., pp. 443-444.

[6]Ibid., p. 445.

III. CONCLUSIONS

In order to determine the best model for describing the no-show rate for new patients appointed at the Social Work Service Clinic and the optimal feasible method for reducing that phenomenon, a three-phased project was undertaken. During the preliminary phase, clinic operating procedures were studied to provide the basis for a data collection mechanism which would not interfere with the functioning clinic or patient behavior. The clinic staff was briefed in order to gain their support and input concerning those variables which should be measured during the study. A data collection form was designed and clerical personnel trained to accomplish the data collection portion of the study.

During the data collection and analysis phase, no-show data from the previous year was analyzed and it was determined that the best no-show model based on the historical data was the quarterly no-show rate. Patient characteristic data was collected for a three-month period, coded, and analyzed utilizing the SPSS subprograms FREQUENCIES and DISCRIMINANT. Chi-square analyses were performed to test for differences in characteristics between patients who showed and those who failed to show for appointments during the period of the study. The only

variable which showed a statistically significant relationship was the delay between the appointment request and the appointment date. A two-group discriminant analysis was performed and a discriminant equation incorporating days delay and rank of the military sponsor was derived and tested. It was determined that this model based on patient characteristics was superior to the clinic-based model derived from the historical data. Three graphical models were derived from an examination of the discriminant equation, and it was determined that the best model for describing the no-show rate for new patients at the Social Work Service Clinic was a scatter diagram of sponsor's rank on one axis and days delay on the other.

The application phase began with an evaluation of alternatives for reducing the clinic no-show rate. The optimal feasible alternative for reducing that phenomenon was the flexible appointment system in conjunction with telephonic intake interviews for selected cases. This system was implemented for a trial period of thirty days and the clinic no-show rate during that period was reduced significantly.

Implications of the Study

This study demonstrated that clinic no-shows are related to identifiable and quantifiable factors which can be associated with certain characteristics of the patient. Furthermore, this study demonstrated that the clinic manager is not limited to merely acknowledging that a no-show problem exists, nor is he

limited to the more traditional means of dealing with this problem. Contrary to the conclusion of Dervin, et al.,[1] discriminant analysis emerged as a potentially powerful tool for analyzing large quantities of data, determining the combined effect of multiple intercorrelated variables, identifying those combinations of variables which most significantly affect no-show behavior, and suggesting to the researcher practical models which can be used to direct concentrated efforts at reducing the no-show phenomenon in a cost-effective manner. Although in this study only two variables needed to be determined by the appointment clerk in order to efficiently direct positive actions at that population segment most likely to otherwise miss their appointments, multiple variables may emerge from similar studies conducted at other clinic sites. In these situations, the challenge to the investigator is to translate the complicated discriminant function into a practical working decision tool. Innovative thinking will be required to combine complementary variables and create a decision model which can be understood and easily applied by the appointment clerk.

Future Applications Within the Military Health Care Delivery System

The methodology utilized throughout this study is entirely applicable to alternate sites and patient populations. Many clinical areas in military health care institutions with unacceptably high no-show rates are characterized by a high degree of physical activity. Patient volume is typically much greater

than that encountered during this study and the demands on the clinic appointment clerk and receptionist are much greater. In such an environment, the researcher would be well advised to design a data collection mechanism to minimize the burden on clerical personnel. By collecting all data telephonically during the appointing process and creating a control group, the time consuming requirement to contact patients who fail to show for their scheduled appointment would be eliminated. The variables to be studied should be carefully screened for relevance and limited to those seriously thought related to no-show behavior and only to those which would be of practical utility in lowering the no-show rate. Certain variables from this study which showed promise, such as delay, sponsor's rank, length of service, referral source, and problem type, should be considered for future studies. Others, such as sponsor's job, should be redefined to possibly reveal a critical influence which was obscured by the broad categories defined in this study. In a more active clinical setting, the benefits from the analytical capabilities of the SPSS subprograms would be enhanced as a larger volume of data is processed and analyzed with great efficiency.

In a more active clinic the alternatives considered and selected for reducing the no-show rate may not duplicate those in the less active Social Work Service Clinic. The methodology utilized in this study, however, will identify those patients at a higher risk for missing appointments and will guide the

manager to a narrower range of individuals who would benefit most from the selected means of intervention. Future researchers should consider alternatives not tried before, but which have the potential for success in that clinical setting. Requiring patient confirmation of appointments or reminding patients of public transportation systems might be the most effective action in a given clinical setting while overbooking or reminders might be more feasible elsewhere.

The military health care manager can no longer afford to absorb the deleterious effects of patients who fail to show for clinic appointments. Neither can he continue to function effectively without the capability of utilizing up-to-date techniques in analyzing no-show behavior and implementing cost-effective actions designed to maximize clinic efficiency. The methodology described in this graduate research project has proven its effectiveness in a low volume clinic. Future research should concentrate on applying this methodology to clinics of greater patient activity as an effective means of optimizing the quantity and quality of health care delivered in an environment characterized by increasingly limited resources.

FOOTNOTE

[1]John V. Dervin, David L. Stone, and Charles H. Beck, "The No-Show Patient in the Model Family Practice Unit," The Journal of Family Practice 7 (June 1978): 1180.

APPENDIX A

MARTIN ARMY COMMUNITY HOSPITAL

CONSOLIDATED NO-SHOW REPORT

MARTIN ARMY COMMUNITY HOSPITAL CONSOLIDATED NO-SHOW REPORT (CY 1982)

CLINIC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	AVERAGE
Allergy	7.9	3.1	6.4	6.2	5.5	0.0	4.5	0.0	0.0	0.0	0.0	0.0	1.1
Cardiology	2.9	2.9	4.1	2.9	2.5	4.3	5.2	6.2	4.8	4.4	5.3	4.5	4.2
Dermatology	11.6	9.7	9.8	9.3	11.3	12.9	6.5	7.2	10.2	10.5	6.8	10.0	9.7
Diagnostic Center	10.1	6.3	7.9	6.3	6.3	2.6	9.4	9.7	7.2	11.4	9.1	11.2	8.1
Family Practice:													
-A1	1.9	2.6	2.7	1.9	1.6	1.3	1.0	1.7	2.1	3.3	2.1	1.9	2.0
-A2	0.0	0.3	1.0	0.5	1.8	1.2	0.4	0.5	0.4	0.8	0.6	0.8	0.7
-B1	2.5	2.2	3.3	2.8	1.2	2.8	2.1	2.4	2.5	2.1	1.5	2.3	2.3
-B2	0.0	0.0	0.0	0.2	0.6	0.4	0.0	0.0	0.4	0.4	0.0	0.0	1.7
-Aviation Med	0.7	0.0	0.7	0.8	0.4	1.2	0.8	0.4	0.8	4.7	2.0	2.7	1.3
-197th	7.1	5.0	3.8	6.9	0.0	5.5	9.0	11.5	10.6	9.9	0.6	3.7	6.1
Gynecology	20.6	18.4	21.9	16.6	18.2	9.5	9.1	13.9	10.6	12.2	13.8	12.0	14.7
Medical	8.4	8.1	8.5	6.9	5.9	10.3	9.3	6.6	5.0	5.8	5.1	6.8	7.2
Neurology	7.2	3.0	4.9	0.0	3.7	0.0	0.0	1.0	1.1	3.8	2.1	1.0	2.3
Obstetrics	11.0	14.8	13.7	11.9	17.4	16.5	12.9	15.2	15.2	17.1	14.1	13.0	14.4
Ophthalmology	12.8	13.4	10.1	6.9	10.2	14.5	9.5	4.3	10.5	4.3	1.2	0.9	8.2
Orthopedics	19.0	13.7	12.7	17.5	0.0	15.8	0.0	14.7	18.9	19.4	18.6	16.3	13.9
Outpatient	17.2	18.9	21.4	20.4	21.9	22.9	19.7	18.4	16.9	19.7	17.5	16.2	19.3
Pediatrics	0.0	0.4	0.5	1.1	1.7	2.7	1.0	3.7	2.2	0.6	4.2	4.0	1.8
Physical Exam	1.0	1.5	1.4	2.0	0.9	1.6	2.7	1.1	2.7	4.2	2.4	2.3	1.9
Surgical	8.2	7.7	8.0	0.0	8.0	6.6	7.9	7.2	6.8	7.8	6.5	4.8	6.6
Urology	0.2	2.4	1.3	2.0	2.0	1.8	1.7	2.8	2.6	1.6	2.0	4.2	2.0
Gastroenterology	0.5	1.8	1.8	2.6	0.8	0.0	0.6	0.0	2.4	0.4	0.0	0.9	1.0
Audiology	4.1	10.8	12.1	7.3	10.8	15.8	14.2	16.3	19.3	5.1	14.9	0.0	10.9
Nutrition	21.4	26.8	23.5	31.0	30.0	37.3	28.6	33.3	24.1	36.2	38.9	30.9	30.3
Occupational Therapy	10.0	11.5	7.3	11.9	10.6	7.2	8.4	4.8	7.3	11.3	7.6	12.4	9.2
Optometry	12.9	8.7	13.8	11.9	12.2	16.8	13.0	14.2	12.9	4.4	6.0	3.8	10.9
Physical Therapy	7.3	6.9	7.6	7.6	7.3	7.0	7.4	6.9	7.2	7.5	7.6	6.8	7.3
Podiatry	14.8	11.6	20.2	0.2	20.0	21.0	19.9	19.2	20.8	13.3	8.7	11.1	15.1
Well Baby	18.6	13.0	11.0	15.0	17.8	17.9	21.3	13.5	14.0	13.3	13.0	18.7	15.6
Woman's Health-OB	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	5.6	6.0	7.2	8.5	2.9
Woman's Health-GYN	0.0	0.0	0.0	21.6	18.4	16.1	12.5	13.0	14.9	19.2	18.3	18.5	12.7
Average of Monthly Rates	7.7	7.3	7.8	7.5	8.0	8.8	7.7	8.1	8.4	8.4	7.7	7.4	7.9

APPENDIX B

SUMMARY OF RESEARCH FINDINGS ON PATIENT CHARACTERISTICS AND THEIR ASSOCIATION WITH NO-SHOW BEHAVIOR

SUMMARY OF RESEARCH FINDINGS OF PATIENT CHARACTERISTICS ASSOCIATED WITH NO-SHOW BEHAVIOR

Investigator and Year		Previous Use of Facility	Self Referral	Physician Referral	ER Referral	Psychiatric Problem	Marital Problem	Seriousness of Problem	Distance from Clinic	Time Delay Awaiting Appointment	Age	Socioeconomic Status	Sex	Minority Race	Previous Attendance Failures	Transportation Considerations	Mode of Payment	Telephone Installed	Family Size	Small Children	Married Status	
Adler, et al.[a]	1963				-	+							-	0	0							
Albert[b]	1964						+				0		-		+		+	+		+	+	
Ambuel, et al.[c]	1964								-		0											
Badgley, Furnal[d]	1961											-	-		+					+	+	
Carpenter, et al.[e]	1981	-	+	-	+					0	+	-	0	0								0
Crag and Huffine[f]	1976														0							
Delk and Johnson[g]	1975	+					+			0		-			0							
Dove and Schneider[h]	1981						0		0	+	+	-			0	+						
Fiester, et al.[i]	1974	+	0	0			0		-	0		0	0	0	0							0
Fiester and Rudestam[j]	1975												-									
Folkins, et al.[k]	1980										+											
Gates and Colborn[l]	1976										+	-		0								
Go and Becker[m]	1979								-		+	-					+	+				
Goldman, et al.[n]	1982	0					+					-		0	+	+	0					
Greenlick, et al.[o]	1972											-	-									
Hagerman[p]	1978										+											

LEGEND: + = Characteristic is positively associated with no-show behavior
- = Characteristic is negatively associated with no-show behavior
0 = Characteristic is not associated with no-show behavior

Investigator and Year		Previous Use of Facility	Self Referral	Physician Referral	ER Referral	Psychiatric Problem	Marital Problem	Seriousness of Problem	Distance from Clinic	Time Delaying Appointment	Age	Socioeconomic Status	Sex	Minority Race	Previous Attendance Failures	Transportation Considerations	Mode of Payment	Telephone Installed	Family Size	Children	Small	Married Status	
Hays[q]	1980					-										+							
Hertz and Stamps[r]	1977											-			+			0					
Hoenig and Ragg[s]	1966						+			0	+		-		0								
Hofmann and Rockert[t]	1969				-	+										+							
Hurtado, et al.[u]	1973	+								0		-	-		+							+	
Irwin, et al.[v]	1981		+								0	+		+									
Jonas[w]	1971											-		0	+	+							
Kegeles[x]	1973												-										
Kellaway[y]	1980												-										
Motil[z]	1971														0			0					
Nazarian, et al.[aa]	1974										+												
Noonan[bb]	1973							+															
Robin[cc]	1976										+												
Rock[dd]	1982										+												
Rogawski and Edmundson[ee]	1971	-																					
Rogers[ff]	1960									+													
Schroeder[gg]	1973								-		0			0	0								
Shah, et al.[hh]	1977				-	+			+		+		-										
Shepard and Moseley[ii]	1976																		-				

Investigator and Year		Previous Use of Facility	Self Referral	Physician Referral	ER Referral	Psychiatric Problem	Marital Problem	Seriousness of Problem	Distance from Clinic	Time Delay Awaiting Appointment	Age	Socioeconomic Status	Sex	Minority Race	Previous Appointment Failures	Transportation Considerations	Mode of Payment	Telephone Installed	Family Size	Small Children	Married Status
Shonick and Klien[jj]	1977											-	0	0	0	0					
Smith	1983	0	0	0		0	0	0	0	+			-				0		0		0	
Stine[kk]	1968												-		+							
Tash, et al.[ll]	1969												-		0							
Weinerman, et al.[mm]	1965											-	+	0	0							+
White, et al.[nn]	1967												-						-			

SOURCES:

[a]Leta M. Adler, M. Goin, Jin Yamamoto, "Failed Psychiatric Clinic Appointments - Relationship to Social Class", California Medicine, 99 (December 1963): p. 388.

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[c]J. Philip Ambuel, Jan Cebulla, Norman Watt, and Douglas P. Crowne, "Urgency as a Factor in Clinic Attendance", American Journal of Diseases of Children, 108 (October 1964): pp. 396-397.

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[q]Granvil L. Hays, "An Analysis of Appointment Failures at the Hansa Allee Dental Clinic", Military Medicine, 145 (July 1980): p. 491.

[r]Philip Hertz and Paula L. Stamps, "Appointment-Keeping Behavior Re-Evaluated", American Journal of Public Health, 67 (November 1977): p. 1035.

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[dd]Daniel L. Rock, "Appointments for Intake Interviews: An Analysis of Appointment-Keeping Behavior at an Urban Community Mental Health Center", Psychological Reports, 50 (1982): p. 864-867.

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APPENDIX C

SOCIAL WORK SERVICE CLIENT INFORMATION SHEET

SOCIAL WORK SERVICE CLIENT INFORMATION

(PLEASE PRINT)

NAME_____ DATE_____

ADDRESS_____ PHONE: HOME_____ WORK_____

BIRTH DATE_____ DATE_____ EDUCATION IN YEARS_____

NAMES & AGES OF CHILDREN/FAMILY MEMBERS_____

_____ _____ _____

_____ _____ _____

DATE OF PRESENT MARRIAGE_____ DATE(S) OF PREVIOUS MARRIAGES, IF ANY

_____

****

INFORMATION ABOUT SPONSOR

SPONSOR'S NAME_____ RANK_____ SSAN_____

SPONSOR'S UNIT_____ CHECK ONE: ACTIVE DUTY____
RETIRED_____
DECEASED_____

SPONSOR'S MOS_____ LENGTH OF SERVICE_____ ETS_____

****

IF YOU HAVE HAD PREVIOUS COUNSELLING, PELASE STATE: WHERE_____
WHEN_____

Briefly state your reason for coming to Social Work Service. If referred, why do you think you were referred:_____

_____

**********DO NOT WRITE BELOW HERE**********

IMPRESSION:_____

_____

_____

_____

PLAN:_____

_____

(If needed, continue on reverse)

FB(MED)FORM 30
1 Oct 76

COUNSELOR_____

_____

APPENDIX D

PATIENT CHARACTERISTICS SELECTED FROM INPUT PROVIDED BY THE SOCIAL WORK SERVICE STAFF

PATIENT CHARACTERISTICS SELECTED FROM INPUT PROVIDED BY THE SOCIAL WORK SERVICE STAFF

SPECIFIC VARIABLE	MEASUREMENT OF THE VARIABLE	A PRIORI NOTIONS
Show/no-show behavior (the dependent variable)	1=patient showed for appointment 2=patient did not show for appointment	A high percentage of newly appointed patients (25-50%) will fail to show.
	VARIABLES RELATED TO THE PATIENT'S DEMOGRAPHIC CHARACTERISTICS	
Travel distance	Distance from residence to clinic: 1=short distance (lives on Fort Benning) 2=medium distance (lives in Columbus, GA or Phenix City, AL) 3=long distance (any other location)	Longer distance results in more no-shows.
Ease of cancelling the appointment	Telephone availability: 1=telephone installed at residence 2=telephone not installed at residence	Patients without a telephone installed at the residence are less likely to cancel, more likely not to show.
Availability of transportation	Mode of transportation at patient's disposal: 1=self-provided (own automobile, walk, bicycle) 2=relied on others 3=public transportation	Lack of personal transportation is related to no-shows.
Military status	Patient category: 1=active duty member with dependent(s) 2=dependent(s) of active duty member 3=retired member with or without dependent(s), or dependents of retired/deceased member	Active duty and dependents more likely not to show.

SPECIFIC VARIABLE	MEASUREMENT OF THE VARIABLE	A PRIORI NOTIONS
Children at home interfering with appointment	Number of pre-school children (under 6 years of age)	Patients with pre-schoolers miss more appointments.
Family stability	Length of marriage (full years)	More stable marriages reflected in lower no-show rates.
Socioeconomic factor	Sponsor's rank (measured numerically from Private E-1=1 to Colonel=19)	Lower socioeconomic status correlated to higher no-show rate.
Demands of military life	Sponsor's job: 1=assigned to training unit 2=assigned to combat unit 3=assigned to tenant unit 4=assigned to no unit (retired)	Inflexible training schedules result in more no-shows for those with sponsor's assigned to training units.
Adaptation to the military system	Length of service in the military (full years)	Less adaptation (fewer years service) reflected in higher no-show rate.
VARIABLES RELATED TO THE PATIENT'S CLINICAL CHARACTERISTICS		
Delay awaiting the appointment	Time delay (in days) between the request and the appointment	Longer delays mean more no-shows.
Patient confidence with this clinic	Previous use of the facility: 1=used before 2=never used before	Previous users will show for the appointment.

SPECIFIC VARIABLE	MEASUREMENT OF THE VARIABLE	A PRIORI NOTIONS
Perceived urgency of the problem	Patient's desire to speak with a counselor telephonically prior to the actual appointment: 1=patient spoke with counselor 2=patient did not speak with counselor	Patients who speak with a counselor feel that the problem is urgent and will show for the appointment.
Level of personal commitment to the appointment	Referral source: 1=self/spouse/parent referred 2=command referred 3=hospital referred 4=other agencies referred	Self-referred patients are more committed to the appointment and will show.
Image of social worker appointed with	Counselor status communicated to patient: 1=officer 2=noncommissioned officer 3=civilian	Patients do not have an especially high regard for civilian counselors and will fail more often when appointed with a civilian.
Type of problem	Categorize by problem type typically treated: 1=marital 2=abuse/violence 3=personality 4=child-related 5=financial 6=other	Child-related problems more likely to show; spouse-related problems more likely not to show.
Confidence in the Social Services counseling process	Previous use of Social Services agencies: 1=used before 2=never used before	Previous users will show for appointments.

APPENDIX E

DEFINITIONS USED THROUGHOUT THE STUDY

Definitions

No-shows.--Patients who fail to report for their scheduled appointments. Not included in this group are patients who cancel or postpone appointments twenty-four hours in advance. Included as no-shows are patients who cancel their appointments within twenty-four hours of the scheduled time because the appointment space normally cannot be filled and the late cancellation has the same effect on the clinic as a patient who fails to show. Terms which will be treated as synonyms include "missed appointments" and "failed appointments".

New patients.--Patients who are not currently being followed at the clinic. Patients previously seen at this clinic, but not currently being followed are considered as new patients for purposes of this study. "First-time appontments" and "initial appointments" are synonymous terms.

Followed patients.--Patients who have been treated at the clinic initially, are registered at the clinic, and are scheduled to return for additional care on a continuing basis.

APPENDIX F

SOCIAL WORK SERVICE

INTAKE INTERVIEW INFORMATION SHEET

SOCIAL WORK SERVICE
INTAKE INTERVIEW INFORMATION SHEET

PART I - For Clinic Use

Name(s):

Date:

Home Phone:

Work Phone:

Check if apply:

/__/ Seen here before

/__/ Telephonic consult requested & provided

Appointment made by:

Self	Cdr	Spouse
OPC	Parent	_____

Appointment date:

Counselor_____
Date _____
Time _____

PART II - For Client Use. Please take a few moments to provide the following information which will be of assistance to the Counselor (please print):

INFORMATION ABOUT THE CLIENT

1. Your local address: _____

2. Do you have a telephone installed at this address? (circle one)
   a. Yes
   b. No

3. What transportation arrangements did you make for this appointment?(circle one)
   a. I drove my own car
   b. I borrowed a car
   c. Another person drove me here
   d. I walked
   e. I used a bus or taxi
   f. Other (please specify) _____

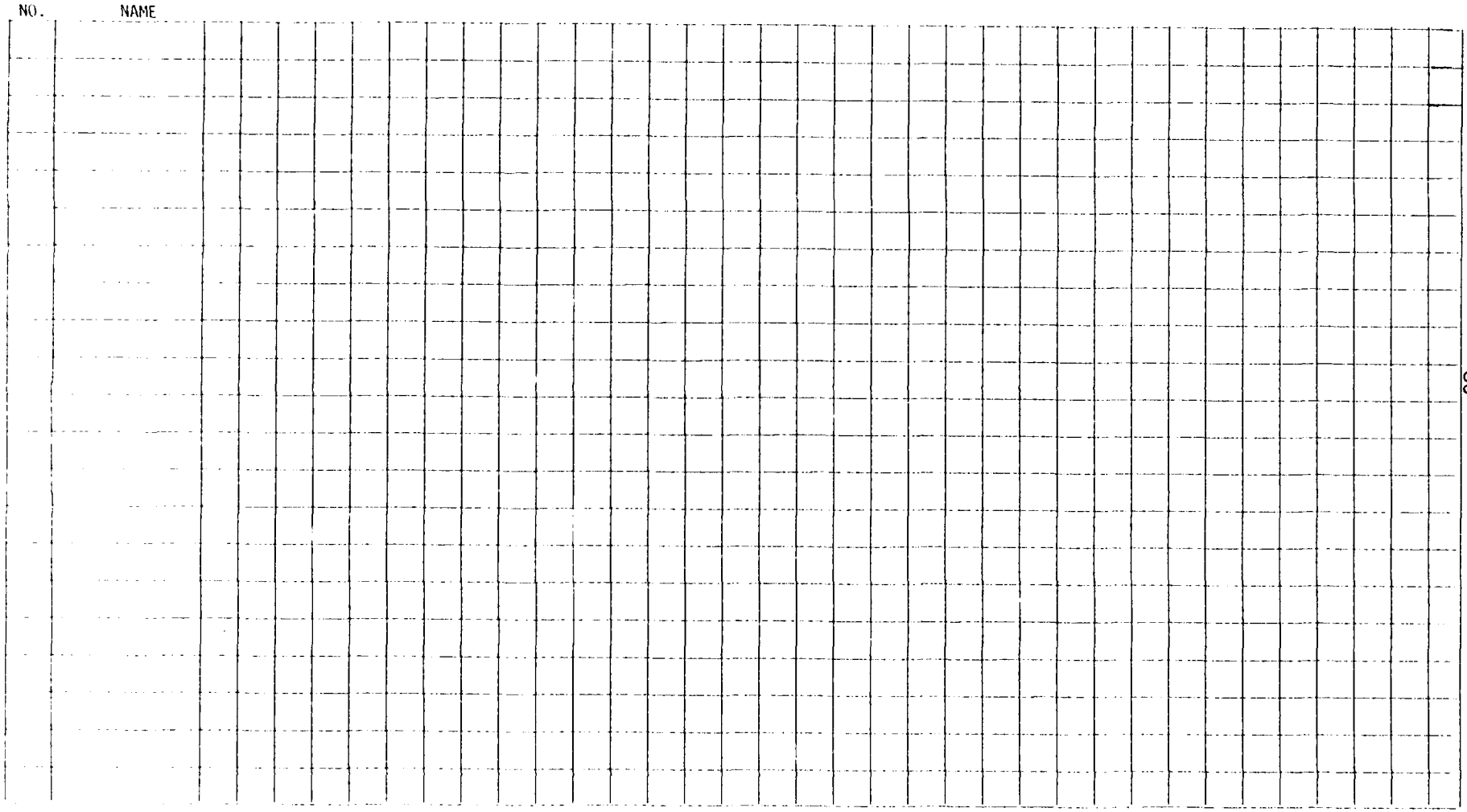
4. Which category below best describes who this appointment is for? (circle one)
   a. A married couple, one of whom is active duty
   b. Family of an active duty member
   c. A retired member
   d. Family of a retired or deceased member

5. Who referred or directed you to this clinic? (circle one)
   a. I referred myself to this clinic
   b. I referred my child or my spouse to this clinic
   c. My spouse referred me to this clinic
   d. Someone from the military unit referred me to this clinic
   e. I was referred from another hospital clinic
   f. Other (please specify) _____
   _____

APPENDIX G

CONTROL LOG FOR NEW PATIENTS

SOCIAL WORK SERVICE
CONTROL LOG FOR NEW PATIENTS



APPENDIX H

DATA RETRIEVAL INSTRUCTIONS FOR THE SOCIAL WORK SERVICE NO-SHOW STUDY

DATA RETRIEVAL INSTRUCTIONS FOR THE SOCIAL WORK SERVICE NO-SHOW STUDY

Follow the instructions for completing the Intake Interview Information Sheet for patients who do not show for their scheduled appointments.

When a new patient fails to show for their appointment, it is important that the receptionist contact them promptly (the following duty day) and that the approach be consistent. Beginning at approximately 0900 hours, attempts will be made throughout the day to contact the client. If not contacted within three duty days, forward to Major Smith for action.

Prior to calling the individual, mark the client's name on the control log to indicate that the patient did not show or cancel the appointment within 24 hours. Also, write "no-show" across the top of the patient's Intake Interview Information Sheet.

1. "Hello. This is Ms Broussard calling from the Social Work Clinic. May I speak with _____?"

Note: Speak only with the person who made the appointment or spouse. If not available, ask them to return your call or establish a time when you can call back.

2. "I noticed you had an appointment on _____ but were unable to keep it. I wonder if I might be able to reschedule another appointment for you?"

Note: Go ahead and schedule another appointment if the client desires. Cross out the original appointment date on the Intake Interview Information Sheet and enter the new appointment date.

3. "Mr./Mrs. _____, we are doing some research about the population we serve and we would appreciate your input. Would you mind answering a few questions? I assure you, your answers will be kept confidential and will have no impact on you personally."

Note: If person agrees, go ahead and ask the questions (state them appropriately. For example, for question #3, ask "What arrangements would you have had to make yesterday in order to make your appointment?) Circle the most appropriate response. If the person wants to quit during questioning, explain that there are just a few questions left and that you truly need their cooperation. If the person does not agree to participate in the questionnaire, try step 4.

4. "I wish you would reconsider. I have only a few simple questions to ask--it won't take but a few minutes and your input may help us to improve the service we deliver. For example, did you refer yourself to our clinic or did someone else direct you here?"

Note: If the person still refuses to cooperate, forward the questionnaire to Major Smith at MEDDAC Headquarters.

APPENDIX I

STATISTICAL SUMMARY AND CHI-SQUARE ANALYSES COMPARING FREQUENCY DISTRIBUTIONS OF PATIENT CHARACTERISTICS AMONG STUDY GROUPS

SUMMARY OF PATIENT CHARACTERISTICS AND APPOINTMENT-KEEPING BEHAVIOR FOR NEW PATIENTS STUDIED AT THE SOCIAL WORK SERVICE CLINIC

	All New Patients Appointed During the Study (N=102)		Patients Who Showed for Appointments (N=74)		Patients Who Did Not Show for Appointments (N=28)		χ^2	df	p
	N	%	N	%	N	%			
TRAVEL DISTANCE:							1.91	2	> .1
Short Distance(lives on Ft Benning)	43	42.2	33	44.6	10	35.7			
Medium Distance(lives in Columbus, GA or Phenix City, AL)	53	52.0	38	51.4	15	53.6			
Long Distance(other locations)									
EASE OF CANCELLING:							0.20	1	> .1
Telephone installed	88	86.3	64	86.5	24	85.7			
Telephone not installed	12	11.8	8	11.1	4	14.3			
Data missing	2	2.0	2	2.7					
AVAILABILITY OF TRANSPORTATION:							0.04	2	> .1
Self-provided	82	80.4	60	81.1	22	78.6			
Relied on others	16	15.7	11	14.9	5	17.9			
Public transportation	4	3.9	3	4.1	1	3.6			
MILITARY STATUS:							0.00	2	> .1
Active duty with dependent(s)	35	34.3	27	36.5	8	28.6			
Dependent(s) of active duty	37	36.3	25	33.8	12	42.9			
Retired/deceased or dependent(s)	30	29.4	22	29.7	8	28.6			
CHILDREN UNDER 6 YEARS OLD:	54	52.9	38	51.4	16	57.1	0.80	1	> .1
LENGTH OF MARRIAGE:							1.86	4	> .1
0-5 years	44	43.1	31	41.9	13	46.4			
6-10 years	18	17.7	14	18.9	4	14.3			
11-15 years	8	7.8	4	5.4	4	14.3			
16-20 years	7	6.9	5	6.8	2	7.1			
21 years or more	9	8.8	7	9.5	2	7.1			
Not married	16	15.7	13	17.6	3	10.7			

	All New Patients Appointed During the Study (N=102)		Patients Who Showed for Appointments (N=74)		Patients Who Did Not Show for Appointments (N=28)		χ^2	df	p
	N	%	N	%	N	%			
SPONSOR'S RANK:							5.30	4	> .1
E-2	1	1.0	1	1.4					
E-3	3	2.9	3	4.1					
E-4	14	13.7	9	12.2	5	17.9			
E-5	17	16.7	10	13.5	7	25.0			
E-6	27	26.5	18	24.5	9	32.1			
E-7	21	20.6	17	23.0	4	14.3			
E-8	5	4.9	5	6.8					
E-9	1	1.0	1	1.4					
Warrant Officer	4	4.0	3	4.1	1	3.6			
O-2	5	4.9	5	6.8					
O-3	1	1.0	1	1.4					
O-4	2	2.0	1	1.4	1	3.6			
Data Missing	1	1.0			1	3.6			
SPONSOR'S JOB:							1.23	3	> .1
Training unit	27	26.5	19	25.7	8	28.6			
Combat unit	37	36.3	26	35.1	11	39.3			
Tenant unit	5	4.9	5	6.8					
Retired or data missing	33	32.4	24	32.5	9	32.2			
SPONSOR'S LENGTH OF SERVICE:							2.68	4	> .1
0-5 years	26	25.5	18	24.3	8	28.6			
6-10 years	21	20.6	13	17.6	8	28.6			
11-15 years	13	12.8	11	14.9	2	7.1			
16-20 years	22	21.6	17	23.0	5	17.9			
21 years or more	17	16.7	13	17.6	4	14.3			
Data missing	3	2.9	2	2.7	1	3.6			
DELAY AWAITING APPOINTMENT:							17.15	3	< .005
0-1 days	42	41.2	39	52.7	3	10.7			
2-3 days	10	9.8	5	6.8	5	17.9			
4-5 days	28	27.4	19	25.7	9	32.1			
6 days or more	22	21.6	11	14.9	11	39.3			

	All New Patients Appointed During the Study (N=102)		Patients Who Showed for Appointments (N=74)		Patients Who Did Not Show for Appointments (N=28)		X^2	df	p
	N	%	N	%	N	%			
PREVIOUS USE OF THIS CLINIC:							0.21	1	> .1
Used before	13	12.7	10	13.5	3	10.7			
Never used before	86	84.3	61	82.4	25	89.3			
Data missing	3	2.9	3	4.1					
PERCEIVED URGENCY:							0.00	1	> .1
Spoke with counselor	18	17.6	13	17.6	5	17.9			
Did not speak with counselor	84	82.4	61	82.4	23	82.1			
REFERRAL SOURCE:							3.32	3	> .1
Self, spouse, or parent referred	39	38.2	31	41.9	8	28.6			
Command referred	6	5.9	3	4.1	3	10.7			
Hospital referred	50	49.0	36	48.6	14	50.0			
Referred by other agencies	7	6.9	4	5.4	3	10.7			
COUNSELOR APPOINTED WITH:							0.38	2	> .1
Officer	2	2.0	1	1.4	1	3.6			
Noncommissioned Officer	17	16.7	11	14.9	6	21.4			
Civilian	83	81.4	62	83.8	21	75.0			
PROBLEM TYPE:							5.25	4	> .1
Marital	27	26.5	20	27.0	7	25.0			
Abuse or violence	12	11.8	6	8.1	6	21.4			
Personality	37	36.3	28	37.8	9	32.1			
Child-related	22	21.6	18	24.3	4	14.3			
Other	4	3.9	2	2.7	2	7.1			
PREVIOUS USE OF ANY AGENCY:							0.45	1	> .1
Used before	34	33.3	26	35.1	8	28.6			
Never used before	67	65.7	47	63.5	20	71.4			
Data missing	1	1.0	1	1.4					

APPENDIX J

COMPUTER PRINTOUT FROM THE SPSS

DISCRIMINANT ANALYSIS OF THE DATA

SPSS BATCH [illegible] 04/15/[illegible] PAGE 1

SPSS VERSION [illegible] (DEC 15, 1980). CPU IS A PERKIN-ELMER 3220

USER MANUAL FOR THE SPSS BATCH SYSTEM

ORDER FROM McGRAW-HILL [illegible] (PRINCIPAL TEXT) ORDER FROM SPSS INC.: SPSS STATISTICAL ALGORITHMS
[illegible] (PRIMER INTRO TO SPSS) SPSS POCKET GUIDE, RELEASE 8
[illegible] (USE W/SPSS,2ND FOR REL. 7 & 8) KEYWORDS: THE SPSS INC. NEWSLETTER

DEFAULT SPACE ALLOCATION... ALLOWS FOR... 50 TRANSFORMATIONS
WORKSPACE [illegible] BYTES 200 RECODE VALUES + LAG VARIABLES
TRANSPACE [illegible] BYTES 900 IF/COMPUTE OPERATIONS

[illegible] SMITH NOSHOW STUDY1
[illegible] FIX=0 /1 SHOW 1 DELAY 2-4 PREVUSE 6 CONSULT 8 REFERBY 10 TOSEE 12
[illegible] DIST 14 TELE 15 TRANS 16 MILSTAT 20 PROB 22 CHILD 24
TIMEMAR 25-27 EVERUSE 29 SPONRANK 31-32 SPONJOB 34 LGTHSVC 36-37

THE DATA LIST PROVIDES [illegible] 17 VARIABLES FOR 1 RECORDS ("CARDS") PER CASE. A MAXIMUM OF 37 COLUMNS ARE USED ON A RECORD.

LIST OF THE CONSTRUCTED [illegible] PUT STATEMENT..
(F1.0,1X,F2.0,1X,F1.0,1X,F1.0,1X,F1.0,1X,F1.0,1X,F1.0,1X,F1.0,1X,F1.0,1X,F1.0,1X,F1.0,1X,F1.0,1X
,F2.0,1X,F2.0,1X,F1.0,1X,F1.0,1X,F2.0)

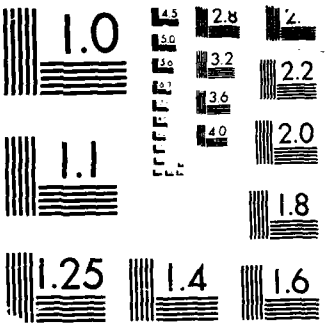
[illegible] INPUT MEDIUM CARD
[illegible] OF CASES 150
[illegible] SET=TRUNC(UNIFORM(2.0))
MISSING VALUES PREVUSE,REFERBY,TOSEE,DIST,TELE,TRANS,MILSTAT,PROB,EVERUSE,
SPONJOB(0)/SPONRANK,TIMEMAR,LGTHSVC(-1)/CHILD(9)
VALUE LABELS SHOW (1)SHOW (2)NO SHOW/PREVUSE (1)SEEN HERE BEFORE
(2)NOT SEEN HERE BEFORE/CONSULT (1)TEL CONSULT (2)NO TEL CONSULT/
REFERBY (1)SELF REFERRED (2)COMMAND REFERRED (3)HOSP REFERRED
(4)AGENCY REFERRED/TOSEE (1)OFFICER (2)NCO (3)CIVILIAN/
TELE (1)TEL INSTALLED (2)TEL NOT INSTALLED/TRANS(1)SELF PROVIDED
(2)RELIED ON OTHERS (3)PUBLIC TRANSP/MILSTAT (1)AD W OR WO DEPS
(2)AD DEP (3)RETIREE OR DEP/PROB (1)MARITAL (2)ABUSE OR VIOLENCE
(3)PERSONALITY (4)CHILD (5)FINANCIAL (6)OTHER/EVERUSE
(1)USED ON SVC BEFORE (2)NEVER USED BEFORE/SPONJOB (1)TRADOC
(2)BOOTCAMP (3)TRAINANT (4)RETIREE
[illegible] PRINT FORMATS DELAY,CHILD,TIMEMAR,SPONRANK,LGTHSVC (2)
[illegible] TABLE N OF
[illegible] DISCRIMINANT GROUPS=SHOW (1,2)/
VARIABLES=DELAY,REFERBY,MILSTAT,PROB,SPONRANK/
SELECT=SET(1)/
METHOD=WILKS

SINCE ANALYSIS [illegible] OMITTED FOR THE FIRST ANALYSIS, ALL VARIABLES
ON THE VARIABLE [illegible] LIST WERE [illegible] AT LEVEL 1.
[illegible] PRIORS EQUAL
[illegible] ANALYSIS 1

THIS DISCRIMINANT [illegible] REQUIRES [illegible] (MAY BE INCREASED) BYTES OF WORKSPACE.
[illegible] BYTES

AD-A133 047 A STUDY TO DETERMINE THE BEST MODEL AND THE OPTIMAL FEASIBLE METHOD FOR R.. (U) ARMY RESEARCH INST OF ENVIRONMENTAL MEDICINE NATICK MA M J SMITH MAY 83 2/2

UNCLASSIFIED HCSD-1-88 F/G 5/1 NL



- D I S C R I M I N A N T A N A L Y S I S -

ON GROUPS DEFINED BY SHOW

102 (UNWEIGHTED) CASES WERE PROCESSED.
48 OF THESE WERE EXCLUDED FROM THE ANALYSIS.
0 HAD MISSING OR OUT-OF-RANGE GROUP CODES.
1 HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
0 HAD ZERO WTH.
47 WERE EXCLUDED BY THE SELECT= VARIABLE.
54 (UNWEIGHTED) CASES WILL BE USED IN THE ANALYSIS.

NUMBER OF CASES BY GROUP

	NUMBER OF CASES		
SHOW	UNWEIGHTED	WEIGHTED	LABEL
1	39	39.0	SHOW
2	15	15.0	NO SHOW
TOTAL	54	54.0	

POOLED WITHIN-GROUPS CORRELATION MATRIX

	DELAY	REFERSY	MILSTAT	PROB	SPONRANK
DELAY	1.00000				
REFERSY	-0.04[illegible]	1.00000			
MILSTAT	0.05[illegible]	-0.[illegible]	1.00000		
PROB	-0.[illegible]	0.11[illegible]	0.17957	1.00000	
SPONRANK	0.04[illegible]	-0.[illegible]	0.03[illegible]	-0.10160	1.00000

CORRELATIONS WHICH CANNOT BE COMPUTED ARE PRINTED AS 99.0.

- D I S C R I M I N A N T   A N A L Y S I S -

ON GROUPS DEFINED BY SHOW

ANALYSIS NUMBER 1

STEPWISE VARIABLE SELECTION

SELECTION RULE: MINIMIZE WILKS' LAMBDA
MAXIMUM NUMBER OF STEPS.................... 10
MINIMUM TOLERANCE LEVEL.................... 0.00100
MINIMUM F TO ENTER......................... 1.0000
MAXIMUM F TO REMOVE 1.0000

CANONICAL DISCRIMINANT FUNCTIONS

MAXIMUM NUMBER OF FUNCTIONS................ 1
MINIMUM CUMULATIVE PERCENT OF VARIANCE... 100.00
MAXIMUM SIGNIFICANCE OF WILKS' LAMBDA.... 1.0000

PRIOR PROBABILITY FOR EACH GROUP IS 0.50000

-------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 0 --------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
DELAY	1.0000000	1.0000000	4.1325	0.9263803
REFERCY	1.0000000	1.0000000	0.943966E-01	0.9981880
MILSTAT	1.0000000	1.0000000	0.381235E-01	0.9992674
PROB	1.0000000	1.0000000	0.55214	0.9394934
SPONRANK	1.0000000	1.0000000	3.6593	0.9340372

* *

AT STEP 1, DELAY WAS ENTERED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	[illegible]	1	1	52.0		
EQUIVALENT F	4.1[illegible]		1	52.0	0.0472	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 1 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
DELAY	1.0[illegible]	4.1[illegible]	

------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 1 -------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
REFERBY	0.9980667	0.9980667	0.41206E-01	0.9255962
MILSTAT	0.9960001	0.9960001	0.40565E-02	0.9263067
PROB	0.9920015	0.9920015	0.78344	0.9123650
SPONRANK	0.9973[illegible]	0.9973[illegible]	3.6737	0.8641331

* *

AT STEP 2, SPONRANK WAS INCLUDED IN THE ANALYSIS.

		DEGREES OF FREEDOM			SIGNIFICANCE	BETWEEN GROUPS
WILKS' LAMBDA	[illegible]	2	1	52.0		
EQUIVALENT F	4.[illegible]		2	51.0	0.0241	

---------------- VARIABLES IN THE ANALYSIS AFTER STEP 2 ----------------

VARIABLE	TOLERANCE	F TO REMOVE	WILKS' LAMBDA
DELAY	0.9[illegible]	4.1[illegible]	0.9340872
SPONRANK	0.9973[illegible]	[illegible]	0.926[illegible]

------------------- VARIABLES NOT IN THE ANALYSIS AFTER STEP 2 -------------------

VARIABLE	TOLERANCE	MINIMUM TOLERANCE	F TO ENTER	WILKS' LAMBDA
REFERBY	0.9943[illegible]	[illegible]	0.[illegible]-01	0.[illegible]4441
MILSTAT	0.9936[illegible]	[illegible]	0.[illegible]-02	0.[illegible]2793
PROB	0.99[illegible]	[illegible]	0.44[illegible]	0.[illegible]4410

SUMMARY TABLE

STEP	ACTION ENTERED	REMOVED	VARS IN	WILKS' LAMBDA	SIG.	LABEL
1	DELAY		1	[illegible]	0.0472	
2	SPONRANK		2	[illegible]	0.0241	

CLASSIFICATION FUNCTION COEFFICIENTS
(FISHER'S LINEAR DISCRIMINANT FUNCTIONS)

SHOW	1 SHOW	2 NO SHOW
DELAY	0.4465[illegible]	[illegible]
SPONRANK	0.3[illegible]	[illegible]
(CONSTANT)	-4.[illegible]	[illegible]

CANONICAL DISCRIMINANT FUNCTIONS

FUNCTION	EIGENVALUE	PERCENT OF VARIANCE	CUMULATIVE PERCENT	CANONICAL CORRELATION	AFTER FUNCTION	WILKS' LAMBDA	CHI-SQUARED	D.F.	SIGNIFICANCE
1*	[illegible]	100.00	100.00	0.3686012	0	0.8641331	7.4474	2	0.0241

* MARKS THE 1 CANONICAL DISCRIMINANT FUNCTION(S) TO BE USED IN THE REMAINING ANALYSIS.

STANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
DELAY	0.74[illegible]
SPONRANK	-0.73[illegible]

UNSTANDARDIZED CANONICAL DISCRIMINANT FUNCTION COEFFICIENTS

	FUNC 1
DELAY	0.[illegible]
SPONRANK	-0.26[illegible]
(CONSTANT)	0.59[illegible]

CANONICAL DISCRIMINANT FUNCTIONS EVALUATED AT GROUP MEANS (GROUP CENTROIDS)

GROUP	FUNC 1
1	-1.1617
2	0.9276

TEST OF EQUALITY OF GROUP COVARIANCE MATRICES USING BOX'S M

THE RANKS AND NATURAL LOGARITHMS OF DETERMINANTS PRINTED ARE THOSE OF THE GROUP COVARIANCE MATRICES.

GROUP LOG DETERMINANT	RANK	LOG DETERMINANT
1 SHS	2	3.926523
2 NO SHS	2	1.266362
POOLED WITHIN-GROUPS COVARIANCE MATRIX	2	3.697705

BOX'S M	APPROXIMATE F	DEGREES OF FREEDOM		SIGNIFICANCE
25.361	7.9771	3,	12465.1	0.0000

CASE SUBFILE	SEQNUM	[illegible]	[illegible]	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
NONAME	1	NO		1		1	0.2912	2	0.2119	-1.3191
NONAME	2	NO		1		1	0.3050	2	0.0566	-3.0457
NONAME	3	NO		1		1	0.6662	2	0.3204	-0.6726
NONAME	4	NO		2	***	1	0.9049	2	0.3820	-0.3608
NONAME	5	NO		1		1	0.4574	2	0.2644	-0.9845
NONAME	6	NO		1		1	0.4871	2	0.2727	-0.9363
NONAME	7	YES		2	***	1	0.6662	2	0.3204	-0.6726
NONAME	8	NO		1		1	0.3140	2	0.2223	-1.2482
NONAME	9	NO		2	***	1	0.4574	2	0.2644	-0.9845
NONAME	10	YES		1	***	2	0.7519	1	0.4744	0.3112
NONAME	11	NO		2		2	0.7581	1	0.4173	0.5749
NONAME	12	YES		1	***	2	0.8062	1	0.4590	0.3821
NONAME	13	NO		1		1	0.6316	2	0.3113	-0.7209
NONAME	14	NO		1	***	2	0.7584	1	0.3442	0.9350
NONAME	15	YES		1	***	2	0.8650	1	0.3976	0.6713
NONAME	16	NO		1		1	0.9432	2	0.3919	-0.3126
NONAME	17	YES		2	***	1	0.9049	2	0.3820	-0.3608
NONAME	18	YES		2	***	1	0.6316	2	0.3113	-0.7208
NONAME	19	YES		2		2	0.4315	1	0.2572	1.4141
NONAME	20	NO		2		2	0.7519	1	0.4744	0.3112
NONAME	21	NO		1	***	2	0.7155	1	0.4848	0.2630
NONAME	22	NO		1		1	0.3140	2	0.2223	-1.2482
NONAME	23	NO		1		1	0.6316	2	0.3113	-0.7205
NONAME	24	NO		2		2	0.7954	1	0.3537	0.9868
NONAME	25	YES		2		2	0.4315	1	0.2572	1.4141
NONAME	26	NO		1		1	0.6647	2	0.4998	0.1921
NONAME	27	YES		1		1	0.6333	2	0.4943	0.1666
NONAME	28	NO		1		1	0.4871	2	0.2727	-0.9363
NONAME	29	NO		1		1	0.3140	2	0.2223	-1.2482
NONAME	30	NO		1	***	2	0.4038	1	0.2492	1.4623
NONAME	31	YES		1		1	0.3140	2	0.2223	-1.2482
NONAME	32	YES		1		1	0.6716	2	0.3113	-0.7208
NONAME	33	YES		1	***	2	0.7155	1	0.4848	0.2630
NONAME	34	YES		1	***	2	0.7519	1	0.4744	0.3112
NONAME	35	YES		2		2	0.9198	1	0.4280	0.5267
NONAME	36	YES		2	***	1	0.9049	2	0.3820	-0.3608
NONAME	37	YES		1		1	0.9049	2	0.3820	-0.3608
NONAME	38	NO		1		1	0.8291	2	0.3624	-0.4572
NONAME	39	YES		1		1	0.6662	2	0.3204	-0.6726
NONAME	40	YES		1	***	2	0.8965	1	0.4077	0.6231
NONAME	41	NO		1		1	0.0218	2	0.0437	-3.3576
NONAME	42	YES		1		1	0.1505	2	0.1643	-1.6791
NONAME	43	YES		2		2	0.9198	1	0.4280	0.5267
NONAME	44	YES		1	***	2	0.7155	1	0.4848	0.2630
NONAME	46	YES		1	***	2	0.8528	1	0.3634	0.8336
NONAME	47	YES		1	***	2	0.9198	1	0.4280	0.5267
NONAME	48	YES		1		1	0.9730	2	0.0971	-2.3738
NONAME	49	YES		1	***	2	0.5679	1	0.2945	1.1986

CASE SUBFILE	SEQNUM	VAR	ACTUAL GROUP		HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
NONAME	50	Y	2		2	0.4033	0.7509	1	0.2492	1.4623
NONAME	51	Y	1	***	2	0.7584	0.6558	1	0.3442	0.9350
NONAME	52	Y	2	***	1	0.6833	0.5057	2	0.4943	0.1666
NONAME	53	Y	1		1	0.4574	0.7356	2	0.2644	-0.9845
NONAME	54	Y	1	***	2	0.2936	0.7841	1	0.2159	1.6778
NONAME	55	N	2		2	0.6010	0.6967	1	0.3033	1.1504
NONAME	56	N		***	1	0.4730	0.7312	2	0.2688	-0.9590
NONAME	57	Y	1		1	0.8098	0.5420	2	0.4580	-0.0007
NONAME	58	Y	1		1	0.7191	0.5162	2	0.4838	0.1184
NONAME	59	Y	1		1	0.9816	0.5931	2	0.4019	-0.2644
NONAME	60	N	2	***	1	0.8098	0.5420	2	0.4580	-0.0007
NONAME	61	Y	1		1	0.0050	0.9434	2	0.0566	-3.0457
NONAME	62	N		***	1	0.1442	0.8384	2	0.1616	-1.7018
NONAME	63	Y	1	***	2	0.9581	0.5822	1	0.4178	0.5749
NONAME	64	Y	2		2	0.4033	0.7509	1	0.2492	1.4623
NONAME	65	N	1	***	2	0.3263	0.5465	1	0.4535	0.4076
NONAME	66	N	1	***	2	0.6349	0.6878	1	0.3122	1.1022
NONAME	67	Y	1	***	2	0.6010	0.6967	1	0.3033	1.1504
NONAME	68	N	1	***	2	0.8816	0.5567	1	0.4433	0.4735
NONAME	69	N	1	***	2	0.9969	0.5923	1	0.4077	0.6231
NONAME	70	Y	1	***	2	0.7155	0.5152	1	0.4848	0.2630
NONAME	71	N	1		1	0.2079	0.8147	2	0.1853	-1.5119
NONAME	72	N	1		1	0.4574	0.7356	2	0.2644	-0.9845
NONAME	73	Y	1		1	0.7191	0.5162	2	0.4838	0.1184
NONAME	74	Y	1		1	0.3140	0.7777	2	0.2223	-1.2482
NONAME	75	N	1		1	0.2079	0.8147	2	0.1853	-1.5119
NONAME	76	Y	2		2	0.7155	0.5152	1	0.4848	0.2630
NONAME	77	N	1		1	0.0003	0.9719	2	0.0281	-3.8849
NONAME	78	Y	1		1	0.8098	0.5420	2	0.4580	-0.0007
NONAME	79	N	1		1	0.4574	0.7356	2	0.2644	-0.9845
NONAME	80	N	1		1	0.1195	0.8494	2	0.1506	-1.7982
NONAME	81	Y	1		1	0.4574	0.7356	2	0.2644	-0.9845
NONAME	82	Y	1		1	0.0617	0.8809	2	0.1191	-2.1101
NONAME	83	Y	1		1	0.4574	0.7356	2	0.2644	-0.9845
NONAME	84	N	1		1	0.3291	0.6376	2	0.3624	-0.4572
NONAME	85	Y	2		2	0.1447	0.8382	1	0.1618	2.0861
NONAME	86	Y	1		1	0.8225	0.7730	2	0.4270	-0.1453
NONAME	87	Y	1		1	0.3291	0.6376	2	0.3624	-0.4572
NONAME	88	Y	1		1	0.2079	0.8147	2	0.1853	-1.5119
NONAME	89	Y	2		2	0.4315	0.7428	1	0.2572	1.4141
NONAME	90	N			2	0.7513	0.5256	1	0.4744	0.3112
NONAME	91	N		***	1	0.7016	0.6704	2	0.3296	-0.6244
NONAME	92	N	2		2	0.5679	0.7055	1	0.2945	1.1986
NONAME	93	Y	1	***	2	0.3705	0.6269	1	0.3731	0.7903
NONAME	94	Y	1		1	0.4716	0.6887	2	0.3113	-0.7208
NONAME	95	Y	1	***	2	0.7324	0.6366	1	0.3634	0.8386
NONAME	96	N	1		1	0.3140	0.7777	2	0.2223	-1.2482
NONAME	97	Y	1		1	0.4574	0.7356	2	0.2644	-0.9845

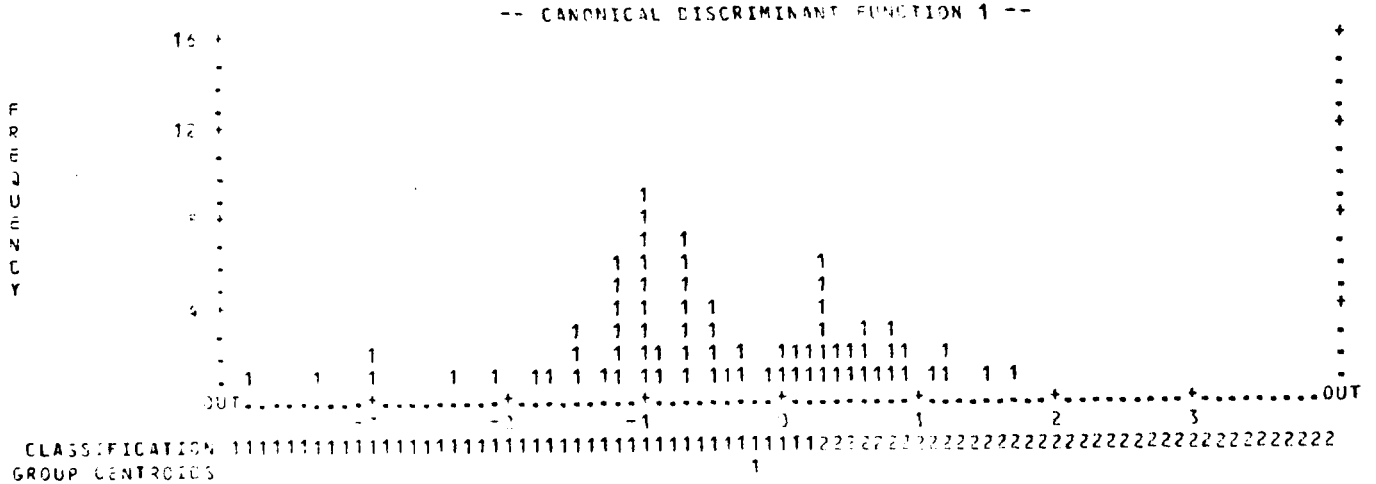
CASE SUBFILE	SEQNUM	RES VAL	SEL	ACTUAL GROUP	HIGHEST PROBABILITY GROUP	P(X/G)	P(G/X)	2ND HIGHEST GROUP	P(G/X)	DISCRIMINANT SCORES
NONAME	98		NO	1	1	0.4574	0.7356	2	0.2644	-0.9845
NONAME	99		NO	1	1	0.4316	0.6887	2	0.3113	-0.7208
NONAME	100		NO	1	1	0.8291	0.6376	2	0.3624	-0.4572
NONAME	101		NO	1	1	0.4574	0.7356	2	0.2644	-0.9845
NONAME	102		YES	2	2	0.8706	0.6269	1	0.3731	0.7903

SYMBOLS USED IN PLOTS

SYMBOL	GROUP	LABEL
1	1	[illegible]
2	2	[illegible]

HISTOGRAM FOR GROUP 1 SHOW

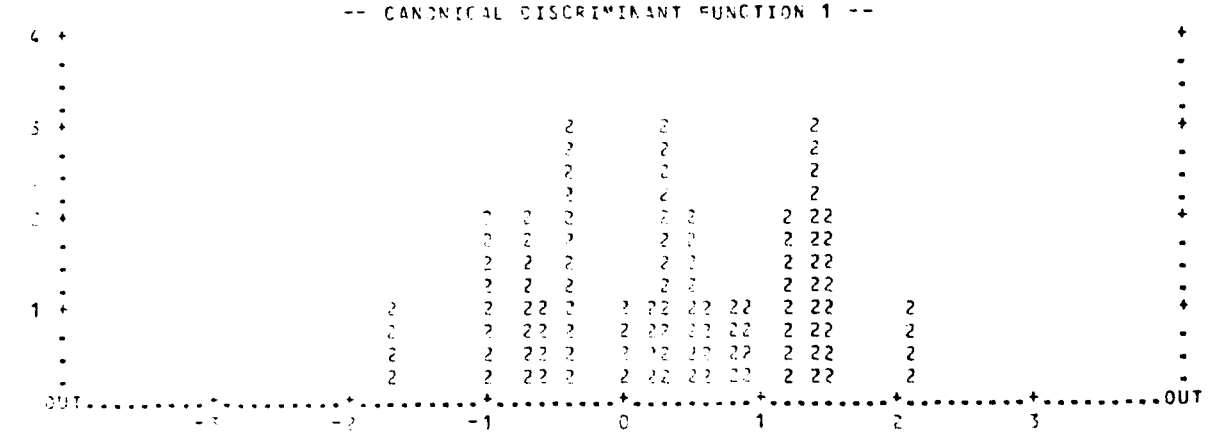
-- CANONICAL DISCRIMINANT FUNCTION 1 --



SECOND DISCRIMINANT ANALYSIS -- [illegible] NO PRIORS

HISTOGRAM FOR GROUP 2 NO SHOW

-- CANONICAL DISCRIMINANT FUNCTION 1 --



CLASSIFICATION RESULTS FOR CASES SELECTED FOR USE IN THE ANALYSIS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1 SHOW	[illegible]	25 59.5%	16 41.0%
GROUP 2 NO SHOW	15	5 33.3%	10 66.7%

PERCENT OF "GROUP " CASES CORRECTLY CLASSIFIED: 61.11%

CLASSIFICATION RESULTS FOR CASES NOT SELECTED FOR USE IN THE ANALYSIS -

ACTUAL GROUP	NO. OF CASES	PREDICTED GROUP MEMBERSHIP 1	2
GROUP 1 SHOW	35	27 77.1%	8 22.9%
GROUP 2 NO SHOW	12	6 50.0%	6 50.0%

PERCENT OF "GROUPED" CASES CORRECTLY CLASSIFIED: 70.21%

CLASSIFICATION PROCESSING SUMMARY

102 CASES WERE PROCESSED.
1 CASES HAD AT LEAST ONE MISSING DISCRIMINATING VARIABLE.
101 CASES WERE USED FOR PRINTED OUTPUT.

APPENDIX K

INSTRUCTION SHEET FOR THE IMPLEMENTATION PHASE OF THE STUDY

PATIENT NO-SHOW STUDY

Beginning 20 April, patients will be appointed under a flexible system.

Ask all callers for the sponsor's name and grade. Enter this information in Part I of the Intake Interview Information Sheet under the patient's name.

If the sponsor's rank is between E-4 and E-7:

1. Try to appoint either the same day or the next calendar day.

2. If unable to appoint today or the next day, appoint as soon as possible and transfer the call to an available counselor for a telephonic intake interview. Check the Intake Sheet and enter the counselor's name.

If the sponsor's rank is not between E-4 and E-7, appoint 3 to 4 calendar days from now to save spaces for others.

NOTE:

1. This procedure applies only to non-crisis patients. contact a counselor if you are in doubt.

2. E-4 to E-7 includes:
   Specialists
   Sergeants
   Staff Sergeants
   Sergeants First Class

   does not include:
   Privates
   Master Sergeants
   Sergeants Major
   Warrant Officers
   Lieutenants
   Captains
   Majors and above

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